AMERICAN GAS ASSOCIATION MONTHLY

Vol. IV No. 4

APRIL, 1922

WE must regard our fellow beings with good will. We must realize and remember that our welfare and their welfare go hand in hand; that one man's freedom cannot rest on another man's slavery; that one man's wealth cannot rest on another man's poverty; that one man's happiness cannot rest on another man's woe, and that it is the same with nations as with men, unless they live with good will towards one another, with consideration for one another's needs and desires and hopes, they will always be in peril and must always anticipate and prepare for some great settlement of dues that will strain every resource they have, if they are to avoid destruction.

EDWARD S. MARTIN, in *Life*

The A. G. A. Committee on Coal and Coke Analyses Reporting Last Year on the Results of Analyses of Standard Coal Samples submitted by several Gas Company Laboratories commented as follows:

> "The Committee is astounded and humiliated over the worthlessness of the majority of the determinations made. The results indicate that the methods outlined in the Gas Chemists' Handbook were not followed in detail and this is the cause of the poor results obtained."

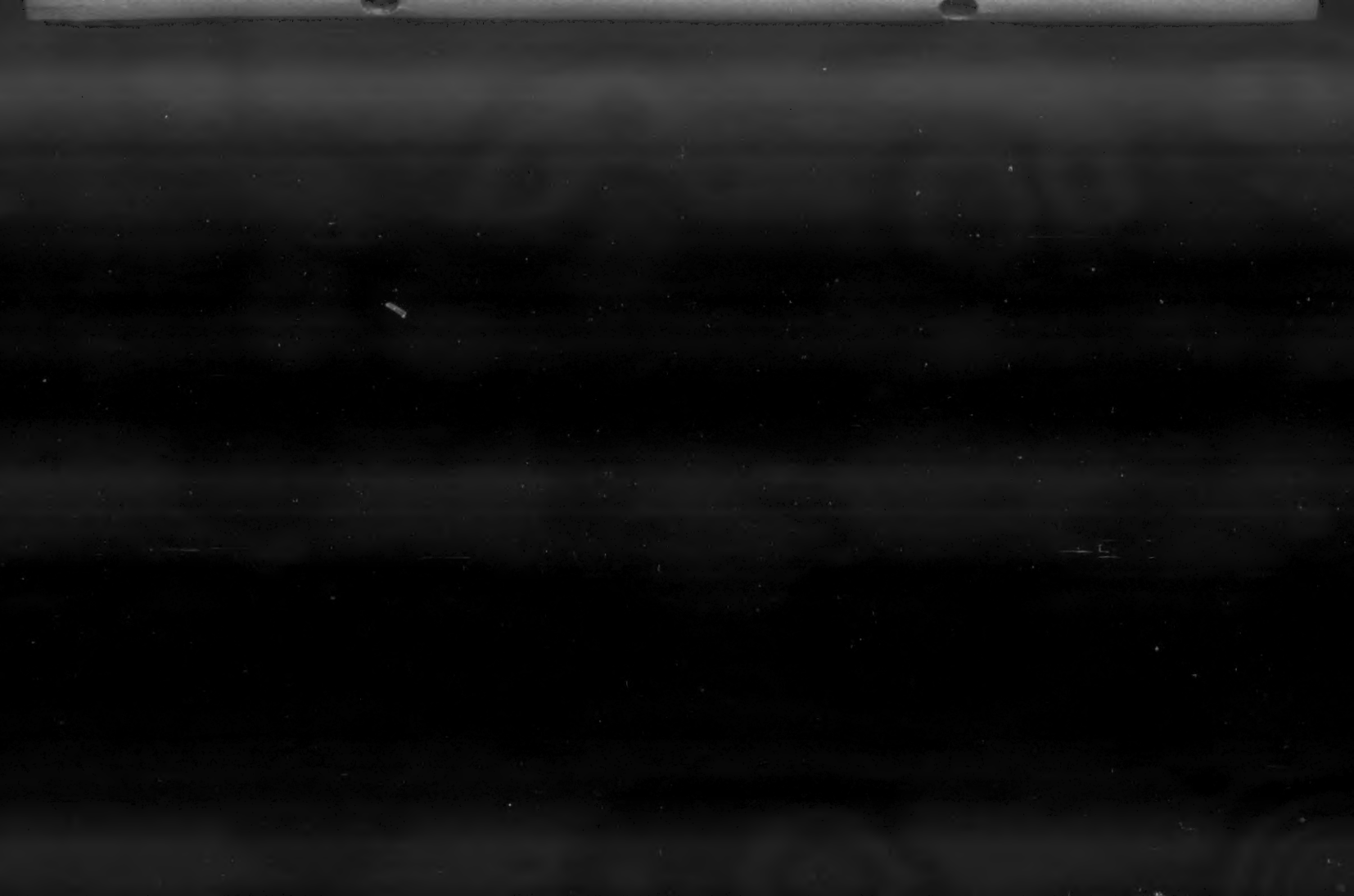
The accurate testing of materials purchased is one of the most important functions of your Chemical Laboratory. The chairman of the A. G. A. Committee on Coal and Coke Analyses, Mr. A. C. Fieldner (Supervising Chemist of the Bureau of Mines), **is a recognised authority on the Analysis of Solid Fuels.**

His report indicates graphically the value of the Gas Chemists' Handbook and the need for Standardization of Laboratory Methods in the Gas Industry.

GAS CHEMISTS' HANDBOOK

(Revised Edition)

$6.00 U. S. and Canada **$6.50 Foreign Countries**



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American Gas Association Monthly

Vol. IV APRIL, 1922 No. 4

What Is Your Opinion?

In the March issue of the A. G. A. Monthly there appeared a question on Gauze Burners, asking all gas men and manufacturers of appliances what their experiences have been as regards burner operation with and without gauzes. Up to the time of the April issue going to press there have been very few answers, all of which were from gas company men. Does this mean that the manufacturers of the very appliances that use gauze burners do not interest themselves in this subject?

We believe that an exchange of views on various questions regarding appliances and methods of installation will bring about true progress quicker than any other means attempted. The results are, however, entirely up to us all as individuals; everyone that has any ideas whatever on the subjects brought up should contribute. Do not delay any longer. Send in your answer today.

N. T. Sellman,
Service Engineer,
American Gas Association.

Highest Court Declares New York 80-Cent Gas Law Confiscatory

Without dissenting opinion, the Supreme Court of the United States on March 6 declared the New York 80-cent Gas Law of 1906 confiscatory and ordered all funds impounded under the order of the lower court to be released promptly to the gas companies, subject only to deductions for such costs as are clearly assessable to the company. It now remains for the Public Service Commission of New York to fix the rate which may in future be charged. The decision is of nation-wide importance as an augury of justice and fair dealing for public utilities and their investors and should mark the end of efforts to fix gas rates rigidly in response to political clamor and lead to an era of impartial, reasonable regulation according to the facts and the law.

The full text of the decision is given in Service Letter No. 36, which has been sent to our membership.

AMERICAN
GAS ASSOCIATION
MONTHLY

Vol. IV APRIL, 1922 No. 4

Public Utility Problems

PROFESSOR HENRY E. RIGGS, Department of Engineering, University of Michigan

ONE hardly can pick up a newspaper or periodical without reading something about some phase of the relationships that exist between the corporations engaged in the rendering of certain services which have come to be called public utilities, and the people. We must keep in mind that the people whose money is invested in them in the form of stocks or bonds are interested, the people who ride on the street cars, or use the water, gas or electric current are interested, the taxpayers who are called upon to pay in taxes to build or support some of the utilities are interested, and every man of us is interested in seeing that everyone in this country is given fair treatment, that everyone is compelled to bear his own proper share of the burdens, and that everyone respects the law.

We Americans have invented new things, we have developed new arts, we have organized companies to utilize these inventions, we have furnished the money and we are the users of the output. We are everyone of us vitally interested therefore in finding that middle ground of right and justice upon which all of us receive fair treatment.

Those lawyers, engineers, economists and accountants who have been working on these problems, and trying to find that middle ground of right have a most fascinating field. I want to give you the briefest outline of it.

Before I undertake to enumerate some of the problems which are today before us for solution I want to discuss for a few minutes a few fundamental things that ought to be kept in mind. (1) Public utilities are of very recent origin, consequently the relationships with which we are dealing are very new relationships entirely unknown in their present form to our fathers. (2) The growth of transportation systems, of

manufacturing, of new applications of various forms of power, and of the development of new arts has been absolutely phenomenal in the last twenty or thirty years, consequently we are dealing with amounts of money, and with properties covering an extent of territory, and of a magnitude undreamed of in the last century. (3) The things which we are dealing with are not only absolutely essential to our present civilization, they make possible the continued existence of our great cities and the continued unity of the American continent. (4) These services are rendered by men —just ordinary human beings, and the great corporations reflect in their management the kind of men in control. They are well run or badly run, public spirited or selfish, distinctly good, mediocre or bad, just depending upon what sort of human nature is directing the policy. I anticipate that this will continue to be true just so long as we have selfishness, greed, ignorance, unselfishness, kindness, sympathy, and other like attributes of human nature, which will be as long as the world continues.

My point is this. There are more distinctly good corporations than bad ones, just about in proportion as there are more law abiding citizens than law breakers. Any general condemnation of all railroads, for example, and all railroad managements because of one New Haven case is wholly unjustified. Just a few more words on some of these points.

I have said that the utilities are of recent origin. Transportation in its primitive forms is as old as the human race, but in all the thousands of years of human history it never progressed beyond the sailing craft and the horse drawn vehicle until the inventions of Fulton, an American, one hundred years ago, and Stephenson, an Englishman, ninety years ago. Note that the invention of the steam propelled ship and the locomotive came just as the stream of population in America was beginning to move west.

Study the census and color your map, at the same time putting on it the lines of railroad as they were built, and you will clearly see that from 1800 to 1840 the population flowed westward along the navigable waterways, then in the following decades it spread inland just as fast as the railroads were built. This great unified nation, covering the continent, is possible only because of the splendid railroad transportation facilities.

The telephone, the telegraph, the electric light, electric traction, the application of electric power, the improvements and extensions of the use of gas and water have all come within the last fifty years. The automobile has come within the last twenty years and it is making epochal changes in the whole transportation of the country. One hundred years is but a little while in the world's history and these things have come within a hundred years—yes, most of them within fifty, and the growth of the last twenty years has been such as to change and revolutionize the whole economic condition of the country. The Pennsylvania Railroad western lines had a traffic of three billion ton miles in 1900 and 9 billion in 1919. The Bell Telephone had 700,000 connections in 1900 and 12,600,000 in 1920. Twenty-five million tons of freight passed the Soo Locks in 1900—80 million tons in 1920. Sixteen millions of this was iron ore in 1900. Fifty-six million in 1920. Similar

figures might be given for many other industries, but enough has been given to illustrate my point. When we drop back and find the Pennsylvania ton miles in 1870 only one-seventh of that of 1900, the Soo ore tonnage only one-fortieth that of 1900, and the telephone not yet invented, the magnitude and the newness of modern business is even more striking.

The period immediately following the Civil War saw a rapid expansion of railway mileage in the Middle West. Federal land grants, state land grants, local aid by the rating of municipal and county bonds, very lax laws relative to incorporation, and comparative ease in floating bond issues on the properties, all tended to speculation. The seventies and the eighties saw much wildcat financing, gross discrimination in the matter of rates, reckless construction and ruinous competition and there were serious causes for complaint against the railroads. These things gave rise to hostile legislation some of it fully as bad as the evils that it was sought to cure. Out of all this came regulation of the utilities.

The various state commissions and the Interstate Commerce Commissions were created between 1886 and 1895 and by degrees the courts clarified various important points. The right to regulate, as stated by our courts, traces back several hundred years to various English common law decisions which rest upon the principle that where business is of such a nature that it is essential, and of such a character that the individual cannot engage in it for himself, the government has the right to regulate when competition fails to do so. In other words when we approach a condition of monopoly government controls and regulates.

Time is too brief to trace these decisions. We may summarize the relationship in this way. The consumer of the product is entitled to adequate service or rates which in themselves are not greater than the value of the service, and there shall be no discrimination. The owner is entitled to a fair return on the fair value of his property. By 1900 we had made great progress in the development of the utilities, we had secured complete recognition of the governmental right of regulation, we had created the machinery for regulation in the various commissions, and we had put that machinery in operation.

I have already called your attention to the tremendous growth between 1900 and 1920. This growth, the development of new industries, and the increased importance of municipal utilities in our large cities have changed the issues and created new ones.

Before I state some of our problems I want to say just a word as to the work of the university men on these problems. It seems to me absolutely essential that college men bring to this task their best abilities as it is only through the co-operation of disinterested students of affairs such as are to be found in the universities that we may hope to reach that middle ground which I referred to as our goal.

Judge Thomas M. Cooley, of Ann Arbor, was very largely responsible for the framing of the Interstate Commerce Commission law and as the first chairman of the newly established commission played a most important part in early regulation of the railroads.

A second Ann Arbor man has as his monument the uniform accounting system of the Interstate Commerce Commission which is the model upon which all modern accounting classifications are built. Henry G. Adams was for many years statistician of the Commission. He called attention to the need of uniform accounts in railway regulation. He urged the adoption of the Law, and when it was passed, upon him fell the task of formulating the system. He is entitled to the lasting gratitude of this country for this great work.

To Mortimer E. Cooley must be given the credit for the development of modern valuation work. In 1900 he was put in charge of the first state valuation. It was the largest undertaking of its kind. It is not too much to say that it was the first valuation. There was no precedent, no rules, no theory to go by. The work then done stands. Its principles have been approved by the United States Supreme Court in case after case. Its precedents have been followed and are being followed all over the land today.

In referring to these men I would not have you think that Michigan alone has furnished these men. Taylor, Myer and Pence of Wisconsin, Swain and Jackson of Massachusetts Institute of Technology and Raymond of Iowa, are a few of the many university men who have done fine work fearlessly and unselfishly.

Valuation began really in 1900. The United States Supreme Court in the Nebraska Rate Case said "a fair return upon the fair value of the property actually in use." What did they mean? No two railroads kept their accounts in the same way. Each industry kept its uniform accounting law was not passed records and statistics to suit itself. The until 1907 and the work of Professor Adams in the development of accounting classifications only began to have effect after 1900. Consequently, accounting records even where they existed were of little use in determining investment on the old properties. Engineering records were equally bad or worse. As a result of these conditions it has been found necessary in nearly every case to completely inventory the property, make a study of costs and then price the inventory.

The work of valuation has been found necessary in connection with the authorization of security issues, taxation, rate making and sale of property. During the past ten years a tremendous volume of this work has been done, several thousand men have been employed and millions of dollars have been spent upon valuation. A good deal of it has been duplication and some has been of doubtful value.

I shall attempt in a few minutes to state some of the live problems that confront us. And I beg of you to keep in mind, the newness of them, the magnitude of them and the human equation which complicates them,—selfishness, avarice, ambition, desire for notoriety, ignorance, all account for wrongs that need to be righted. These are just as much the attributes of the political leader as of the corporation manager. The wrongs which give rise to complaint need local treatment, generally, and measures which are made of general application may not be the proper ones. No two cases are alike. These things lead me to say that some of the news-

papers have done irreparable harm by a continued campaign, not against some specific wrong that needs to be righted, but against all men engaged in some particular field of industry. They have created public sentiment based on lack of information and in many cases have made a bad condition worse.

We have yet to solve the following problems:

(1) We may secure these public utilities in one of two ways, by encouraging private capital to come in and build them or by building them as publicly owned and publicly operated utilities paid for by taxation when not self-supporting. Which shall we do? Certain utilities, like sewers, waterworks and others which have to do with public health are generally owned publicly and are in the great majority of cases well run. Electric properties, transportation properties, gas, telephone and telegraph are generally privately owned, and by many it is contended that the nature of the industry is such that public operations would not be likely to succeed. We still face a long period of experimenting with the problems of public ownership.

(2) When privately owned, who owns the utilities? We do. It is our money directly or indirectly, in the form of stocks or bonds—ownership or loan, which must build them. How may we so safeguard the organization, financing and capitalization as to secure a maximum of safety to the investor? Many of our corporate evils can be laid at the door of the banker who finds the money for construction. Much more work remains to be done before this problem of organization and financing is solved.

(3) Rates shall not be excessive in themselves, but shall be sufficient to give a fair return on the fair value of the property. Three questions are not yet answered. What is the value of the service? What is a fair return? What is value? To me it seems that a fair return is such a return as will attract capital to that particular industry in that particular city in which it is located. It is very certain that no one rate is to be applied everywhere, and the events of the last three years make it equally clear that changing financial conditions ought to be met by a variable rate.

Value is a hard nut to crack. It always has been. Did the court mean "Fair return on original cost?' or "on present investment?" or "on Replacement cost at present day prices?" We had been getting this question pretty well settled when the war came along and added a lot of new complications.

(4) How shall the utility be taxed? We all stand together on the proposition that the burden of taxation shall be distributed to all of the people in proportion to their ability to pay. Taxation should be uniform and just. The utilities in some states carry an altogether excessive burden, in others they come near to getting off scot free.

(5) There is the elusive problem of depreciation. We need not only to get a better understanding of it, but we need to clear away a tangle of confusing words and get down to simplicity.

When you invest your money in a mortgage on real estate or a government bond you expect to receive interest during the entire period and at the end of the period to receive your money back.

When you invest in a security of some public utility the courts say you are entitled to a fair return and "to maintain your investment intact, as it was in the

beginning" but this theory does not always work out.

Property wears out, decays, becomes obsolete or in some other way depreciates, and unlesss provision is made to secure enough out of earnings to make good that loss, the owners wake up after a few years to find that they have been living in a fool's paradise and that their capital has gone, or has been diminished.

The wearing out of a waterworks pump over a period of fifteen or twenty years is an operating expense, part of the cost of pumping water. When it is worn out and replaced by another similar pump, there has been no new thing added to the property, which adds value or should increase the captial. Unless the owners collect enough each year, to make good the losses of that year, capital is being diminished. What steps are the proper ones to prevent this loss? That is the problem of depreciation.

These things that I have named, along with many others of a more or less local nature, are confronting us in the cases that are continually coming up. Puzzling and intricate they often are. Commonplace and routine they distinctly are not. They call for the best that there is in men—not alone one group. The solution must be found by engineers, accountants, lawyers and economists, but we all, as citizens and as business men, need a better knowledge of the subject and greater tolerance in our consideration of it.

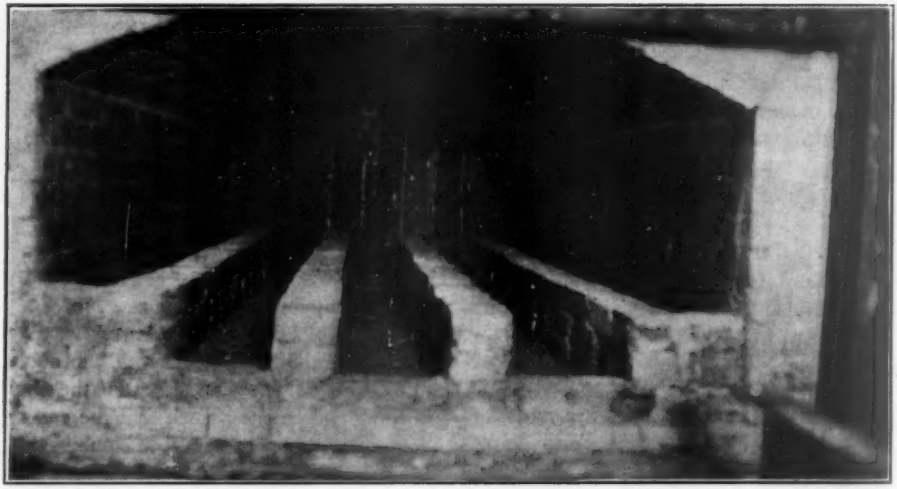
Gas-Fired Vitreous Enamel Furnace

COMPARATIVE figures on the operation of a gas-heated furnace for firing vitreous enamel ware and one using coal as fuel, show that for the same period of time and doing the same work, the cost per hour with the gas furnace was 40 cents less than with the coal furnace. In addition, production was trebled, and rejections from imperfect firing eliminated.

Taking an average of furnaces working on similar materials in different plants, some using electricity, some using fuel oil, others using coal, it was found that the gas furnace produced better ware and did it faster than any of the others and at a lower cost per pound of finished product. The average cost of city gas of 550 B.t.u.'s per cubic foot was 90 cents per thousand standard cubic feet, and proved cheaper than electricity at 1c per kilowatt-hour; oil at 5c a gallon; or coal at $4 a ton. Still cheaper costs can be obtained if the flue gases from the gas furnace (which are absolutely clean) are used in waste heat boilers and dry rooms.

The furnace illustrated above is one of a number in use by various vitreous enameling factories, and has a working chamber 4′ wide by 10′ long by 30″ high, occupying a floor space only 7′ wide by 13′ long, and is heated by ten Surface Combustion gas burners located five on each side. The design of the gas burning equipment is such that the exact amount of air necessary for combustion is automatically drawn through inspirators, so that the gas pipe is the only one necessary, and the entire furnace is controlled with one valve. Combination automatic and hand control is provided so that exact temperatures are maintained.

The second photograph shows the interior of a furnace of this type after



nearly two years' continuous operation in the plant of the Chicago Vitreous Enamel Products Co., and examination indicates that it will run many more years without any maintenance or replacement expense whatever. This is made possible by elimination of the muffle and all similar combustion chambers; this furnace hearth rests on a solid foundation. The gas is burned in the firing chamber itself, and all heat imparted by direct radiation; hence none of the products of combustion come in contact with the ware. The simplicity of the gas furnace makes it lowest in first cost.

This type of gas-fired furnace can be brought from cold, to a working temperature of 1800°F. in 45 minutes; or if the operator is firing cast iron ware at 1400°F. and wishes to change to steel at 1800°F., this change in furnace temperature can be made in 5 minutes. To start a coal-fired muffle furnace and bring it from cold to working temperature requires at least a day, and to change from 1400° to 1800°F. requires several hours, and while not as slow as coal, neither the oil nor the electric furnace can compare with the gas furnace for speed and production.

And we all praise famous men,
Ancients of the College;
For they taught us common sense,
Tried to teach us common sense,
Truth and God's own common sense,
Which is more than knowledge.
—*Kipling.*

Students of Today the Gas Men of Tomorrow

F. C. WEBER, Chairman of the Committee on Co-operation with Educational Institutions

AT a recent meeting of the Committee on Cooperation with Educational Institutions several important points were agreed upon that the Committee regards as fundamental to the successful cooperation between the gas industry and educational institutions, and the Chairman has been asked to use the A. G. A. Monthly and this particular opportunity to present the Committee's first message to the members of the American Gas Association.

The scope of the work which the Committee has under consideration is broad and, we believe, comprehensive.

There are at least two channels through which immediate and effective progress may be made.

First, by talks—or they may be called lectures—given by representative men, the successful operators of gas properties and other utilities before students in those schools that offer courses adaptable to our needs. They should be practical talks as well as inspirational and can be so interestingly presented as to stimulate an adequate percentage of the student body to become interested in taking up work in the gas industry and in public utilities in general. In this direction the work of the Committee has already taken practical shape. Through the efforts of its members, such talks and lectures have already been given before the student bodies of several universities and colleges and arrangements have been made for several others.

Second, the Committee urges as a timely suggestion that as many gas companies as can, employ college students during the summer months in work along operating lines, especially in situations where production and distribution problems are active.

The greatest immediate good will undoubtedly come from carrying out the two suggestions offered above. The Committee therefore solicits the earnest co-operation of executives and operators and asks them to work with the Committee in putting over at least these two important features. There will be other suggestions to offer later as the work of the Committee progresses, but these are capable of being put into practical use immediately. A fitting accompaniment to this first announcement of the Committee is the article which follows, which is the lecture delivered by a member of the Committee, F. C. Freeman, before the student body of Brown University.

Our Committee has already been called upon to act in an advisory capacity in suggesting the curricula of a course in gas engineering by schools that are already giving or propose to give such courses.

THE GAS UTILITY

Lecture by F. C. Freeman of Providence (A member of the Committee on Co-operation with Educational Institutions) before the student body of Brown University.

The commonplace of today was the unusual—the mysterious—of yesterday. The Gas Industry measured in terms of our life is old, while, in terms of the world's life, it is but of yesterday. Napoleon, when he heard that London was to be lighted with gas, called the project "a great folly." Sir Walter Scott wrote a friend, "There is a madman proposing to light London with—what do you suppose—why, with smoke." Even later than that people who saw Westminster Bridge lighted with gas thought the pipes conveyed fire, and, when gas was installed to light the House of Commons, the members were afraid to touch the pipes with ungloved hands for fear that they might burn their hands.

Those men were the leaders of their day and we may smile in our superior knowledge handed down to us through the experience of time, but what more do we collectively know about gas than those men did? What have we learned of our own accord, found out about the gas business that has not been handed to us on the golden platter of world's experience and our daily contact with the commonplace? Mighty little. To most of us the gas industry today is as unknown and mysterious as it was to the leading men of the late 18th and early 19th century. The reason, therefore, is that you and the gas industry itself have taken the gas utility for granted. The gas business has not advertised itself and you have not taken the trouble to find out about it. There is a wonderful romance that you have never seen hidden behind the gas burner and I am certain that your interest will be aroused by the few things I can tell you in a short time.

Have you ever stopped to think what public utilities mean to our complex city life—civilization? Go back and draw water from the individual or community well placed nearby or far from you. Go back and ride in the one-horse chaise or horse street cars. Go back and burn the tallow candle. Go back and cart and carry your coal and wood and blow your bellows for your kitchen and industrial use. Go back and build your individual boilers and steam engines for the motive power of your factories and homes. Go back and run to Doctor Smith over in Olneyville and tell him mother is sick.

No more open the faucet and hot or cold water for your bath. No more a ride from Grand Central to the Battery in but a few minutes. No more the white way—a pull of the string or turn of the switch and an instantaneous flood of light throughout the room, building, or street. No more a match and turn of the cock for Christmas dinner in the home and apartment house, or many industrial heat uses. No more the washing machine and fan in the home and the innumerable uses of the industrial motor. No more a call over the wire to Doctor Smith, "Come at once, mother is ill."

Can you imagine it?

Take away the public utilities and our city life could not exist. We would be driven out of the cities to an individual effort for life. No more the comforts and pleasures which we have become accustomed to accept without thought of the why therefore. Industry without the public utility would stop.

The public utility to us is commonplace—an everyday thing—something we take for granted. Our city life is a collective effort and just so is the public utility a collective or community service or usefulness. Not so commonplace but that we should stop, think and realize that the public utility is an absolute necessity to our well-being and the growth of our present-day civilization.

The public utility, because it is a necessity, must operate day in and day out, 365 days per year. Rain or shine, hot or cold, prosperity or depression, no matter whether coal, oil, and labor are easy to obtain or not, the public utility must always be ready to supply the community demands. The public utility, therefore, offers a field of employment to us which is sure and continual and it does so employ a large host of our country's workers. Every young engineer would do well to consider this field of endeavor when entering upon his life's work, for the engineer plays an important part in the operation of our utilities.

Our purpose in this world should be to render service to mankind. To increase the comforts and pleasures of a man while we live and to decrease the physical effort necessary for support of life. There are fields of endeavor wherein we may work for our selfish ease but there is no field of production which so directly helps the world as does that of the public utility. Every public utility employee has uninterrupted employment, he is a constant producer, a direct worker in the fundamentals of our civilization. The utility worker has a noble occupation.

Why is it that there is so little knowledge of the gas industry among our people? Most of us have a hazy idea that gas is made from coal, of the gas tanks which we see and of the gas meter which we know runs around when no gas goes through it, or at least always registers more gas than has actually passed through the meter. The main reason is that the gas industry has just gone along and sawed wood without saying anything about it and the other reason is that gas can't be seen as a physical object, we have no starting point from which to build up our knowledge, unless we are interested enough to go out and inform ourselves. Therefore, we feel gas is mysterious.

The electric utility has been the best advertised of all, we know they use coal to make steam, have steam turbines and generators to produce the electricity, we see the wire distribution system. We read a lot about electricity, practically nothing about gas. Water we see. Street cars, tracks, motormen, and our six cents we see. We see the telephone wires and know there is a magnet in the receiver which changes sound waves to electric impulses over the wires. But there is very little we can take a grip on in the gas business.

The gas industry in the United States is one of the biggest collective efforts of service for man in the world. Think of the vast army of coal miners, oil producers, locomotives, railroad cars, transportation workers, and those for other materials behind the gas business, besides the 80,000 men directly engaged in gas production and distribution. There are over 1,000 gas plants in our country, serving over 4,500 cities. The gas business has nearly nine million

meters, so that practically half of our people enjoy its service (45 to 50 million). There are about four billion dollars invested in the business; this money is not furnished by any clique or gas trust but is loaned by over 300,000 investors. Through our banks, saving funds, and insurance companies many of us are financially interested in our gas industry though we may never have realized it.

There are sold 400 billion cubic feet of gas each year; this would cover our entire state with a layer 15 feet deep, or would be equal in volume to 200,000 Turks Head buildings. To produce this gas there were 10 million tons of coal used with one million tons in reserve storage for emergency use, and 900 million gallons of oil. It was conducted through main street pipes which would stretch around the world three times. The main street pipes of Providence, if laid end to end, would reach from Providence to Buffalo. Just stop for a moment and think of the money buried underground and of the job of the gas engineer in laying out such a system and keeping it in working condition.

We have been talking in millions and billions. The gas business is a mighty big industry, bigger than we have most likely ever thought of, or perhaps can even realize.

All utilities are under state control by public utility commissions. A utility is not allowed to profiteer or charge anything it pleases for its service and commodity. A utility is in constant need of money to extend its service to meet the reasonable demands for it. Gas works, gas holders, street pipes, supply pipes, meters, etc., require money for their extension. The utility must go out and get this money, so that, in reality, it is in the business of selling investments besides that of selling its service and commodity. The public service commission see to it that the utility does not collect more from its customers than the cost of the money employed in the business plus the operating expenses. That is, the income equals the outgo expenses, with no excess profits.

Anyone entering the gas business, would, naturally, ask, "How about its future growth?" I have heard people say that the electric business is going to drive the gas business off the map. Is it so? Forget it, don't let it concern you. The electric business will lap over the lighting business of the gas industry but in the main it will stop there, due to the fact that the electric man can only convert 10 to 15 per cent of the heat energy in coal into electricity, while the gas man can convert 60 per cent of the heat energy of the coal and oil used into gas. It doesn't take much figuring to satisfy our minds, when we stop to think that 6 cubic feet of gas have as much heat energy as 1 K.W. hr.; with gas at 12½ cents per 100 cubic feet, electricity would have to sell at the impossible figure of 7½mills per K. W. hr.

When gas was first used, over 100 years ago, it had only one use, that of light in an open flame burner. Today it has over 1,000 listed uses among which may be mentioned kitchen ranges and water heaters, gas irons, laundry ironing machines, space heaters, hatching machines, crematories, hotel ranges and broilers, large automatic baking ovens, candy furnaces, metal melting pots, glass and china kilns, hot presses, jewelry

manufacture, tire heaters, brazing tables, cork floor manufacture, inert gas manufacture for process work, annealing ovens, stereotype machines (present day newspapers would go out of business without gas), bench furnaces, muffle furnaces, gas steel treatment furnaces, etc. The list is endless; new uses are being found each day. Any work, from very low to extremely high heats and the use of automatic heat treatment machinery, can be performed with gas.

The olden day method of charging for gas is all wrong. The equitable way is to charge on the basis of the cost of the money invested to supply the customer, the individual service rendered the customer, and the commodity use by the customers. When such a system of charging becomes universal, the industrial use of gas will increase its already rapid pace and grow like a whirlwind.

It is estimated that the present day use of gas is 22 per cent for illumination, 50 per cent for home use other than illumination, and 23 per cent for industrial use. There are 6,400,000 domestic cooking appliances in use, 1,300,000 water heaters, 900,000 space heaters. There are 7,600 hotels, 2,300 clubs, 74,000 restaurants, and 2,000 other institutions using gas for cooking.

Now for concrete facts on the growth of the gas business. The per capita per year consumption in 1898 was 726 cubic feet; in 1908 1,764 cubic feet; in 1918, 3,683 cubic feet. This means that, not only have the total sales increased, but something which is more important, the use per person, has more than doubled every 10 years.

It is not realized that the gas industry is supplying the great majority of a community at a ridiculously low cost. Here in Providence 81 per cent of the customers on the gas company's books only spend an average of 7½ cents a day with the gas company. Think of it, 7½ cents per day! Less than the price of a shoe shine, or many other things folks buy daily without any thought of price. If our community were furnished with coal, coke, and wood free of charge for cooking, and candles or kerosene for lighting, they would not care to stoke a kitchen fire, regulate draughts, carry ashes, trim lamps, and clean chimneys, etc., even if they were paid 7½ cents per day. They can afford to spend more than 7½ cents per day for the ease, comfort, and results they get from gas and will in time realize this. There is still a big field for growth among the customers already served by the gas utility.

The industries are just beginning to realize that, not only can gas compete in many cases with other fuels on price, but the results unfailing and constant in their manufacturing processes with gas, cannot be equalled with other fuels. Industrial gas will sell bigger than ever.

The gas business is only in its infancy. By reason of the inherent ability to convert heat efficiently from the solid state to the gaseous and the many gas heat application advantages in the home and industry which are becoming better known daily, the gas industry is bound to grow bigger than ever and there is a good field for us to grow with it.

The job of a gas engineer calls for a real honest-to-goodness man. Probably more so than does the position of any other industry. Theoretically, a gas engineer must have a reasonably wide knowledge of electrical engineering, me-

chanical engineering, chemical engineering, civil and construction engineering, in addition to the specific knowledge of gas matters.

In a large gas manufacturing plant the gas engineer must be able to generate and distribute electric power and operate an extensive motor system. He must be able to generate and use steam efficiently and know how to operate extensive steam-using equipment and mechanical apparatus. He must know the chemistry of coal and oil, combustion, gas manufacture, gas purification and treatment, and by-products. He must know the design, layout, and construction of gas works and gas distribution systems. A gas engineer never comes from a college as a finished product, a good fundamental knowledge coupled with interesting and carefully directed training and experience is necessary. The field of work is so broad that there is never the sameness to the work as in other lines of production; due to the great number of variables involved in gas production, problems arise daily, and interest can never lag.

The personal element of the men at the gas plant enters to a greater degree in the manufacture of gas than it does in any other utility or many manufacturing processes. A turbo-generator has an efficiency which was built into it by its manufacture, the electric operator does not affect this efficiency. Gas making, cleaning, and purifying machines, however, do not have any efficiency built into them, their results are largely dependent upon the gas management and operators. Every part of the plant must be continuously watched, the operators must be always on the alert. Pressures, temperatures, chemical control tests, weight and volume measurements are being made continuously, and, as these vary, and the materials used for gas manufacture varies, changes desired to correct conditions must not only be known, but they must also be effected. The brain and brawn of man are always at work. The number of variables affecting gas manufacture are great and involved, even a change in the weather affects the heating of a gas-producing oven. The variables increase with the size of the gas works. A gas man must always be on his toes.

Have anyone of you ever stopped to consider what it means to keep up an uninterrupted supply of gas? Any time, no matter when, light a match, turn the cock, and the gas is ready to serve you. Gas supply interruptions are rare. If the service of any other utility goes out, there are no precautions necessary to turn it on again. The gas man must keep up the supply because interrupted service is not so easily remedied. Little do many of us realize the many anxious days and nights gas men went through during the war when coal, oil, supplies, repairs, and men were lacking. It was no small task to keep up the uninterrupted supply of the necessity—Gas.

The world is dependent upon the gas works for other things besides its gas. As the supply of anthracite fuel gives out, it will have to turn to coke for a clean, smokeless fuel. Coke is not a makeshift for anthracite coal because coke has more heat value than the present delivered anthracite. Until the recent development in which ammonia is made synthetically by the combination of nitrogen and hydrogen, the gas works

was the only commercial source of that important product, ammonia.

The gas works today is the source of supply of xylol, benzol, toluol, naphthalene, phenol, and anthracene. These names may not mean much to you but the products are the starting points of an endless list of chemical compounds used for medicines, dyes, photography, solvents, wood preservatives, disinfectants, explosives, paints, flavoring extracts, perfumes, paving, roofs, tanning, buildings, etc. These crudes or starting points are variously treated and changed chemically by manufacturers into very useful compounds for the world. The crudes may be extracted from the gas or from the coal tar. It does not pay the gas man to extract them, so that they are usually obtained by the coal tar works, who treat and dispose of the coal tar purchased from the gas plant.

Gas for illumination was first applied by William Murdock of Cornwall in 1792. He found that, when soft or bituminous coal is heated, it gives off a gas which he first used to light his cottage and office. In America, an Italian, Michael Ambroise, at Philadelphia, in 1796, first used gas for exhibition purposes. He had an exhibition of fireworks and advertised that, in addition to the ordinary fireworks, he would show a grand fireworks by means of light composed of inflammable air.

I doubt that there are a half a dozen people in our state who realize that gas was probably used for commercial lighting the first time in America at the Bath House, Newport, R. I., in 1813. David Melville and Winslow Lewis had obtained a patent to make hydrogen gas from pit coal. It really wasn't hydrogen, but coal gas. Similar lighting systems were installed in cotton mills at Watertown, Mass., and Wanskuck and Arkwright, R. I.

The cities to use gas were as follows: —Baltimore in 1816, Boston 1822, New York 1823, Philadelphia 1836, New Orleans 1835, Pittsburgh 1836, Louisville 1838, Cincinnati 1841, Albany 1845, and Providence 1848.

Until 1875 all the gas made was coal gas, but at that time a carburetted water gas plant was built first by L. S. C. Lowe at Phoenixville, Pa.

Coal gas is made by distilling gas from bituminous coal by means of heat. Carburetted water gas is not water to which some chemicals have been added, nor is it water vapor as is commonly assumed, due to its name. I have been asked if Pawtuxet River water could be used, or if it was necessary to strain water before it could be used to make water gas. This illustrates the effect of the name. Water gas is made by chemically combining steam, which is water, hence the name, with incandescent carbon of anthracite coal or coke. There is no gas in the coal or coke, but these fuels are used up leaving ash. The resulting gas formed by carbon and steam joined together is mixed with an oil gas produced by vaporization of gas oil by means of heat. This is carburetted water gas.

At the end of this talk I will show you some pictures of coal and water gas machines and plants. I will also make coal and water gas by means of experimental machines which I have set up.

The raw gas after it is made must be cooled, scrubbed, cleaned, and purified. The tar, ammonia, and sulphur are removed in the order given. Water gas does not have ammonia. All the gas,

before it is put into the gas tanks or holders, is measured. The meter total at the plant shows less than the total of the consumers' meters, unaccounted-for gas, which is due to leakage, condensation, temperature differences, slow customers' meters, and stealing.

The gas holder is similar to a sliding telescope or an inverted drinking cup. It forces the gas through the street mains, supply pipe to house, meter, and housepiping to point of use. Gas to outlying holders, such as Olneyville, is pushed from the works through a separate main.

The gas meter is one of the oldest subjects of jokes. If we should pay our shoe shine, street car rides, cigar, cigarette, and movie bills at the end of the month instead of daily, we would be surprised at their size. It is because the gas meter doesn't yell up the cellar stairs every day, that, at the end of the month, folks are skeptical of the amount. If they are honestly interested and desire to employ foresight, it is a simple matter to walk down the cellar stairs and read the meter daily, instead of daring the gas company to show how the gas was used after the month had passed.

A gas meter is an exceedingly accurate measuring mechanism. The average accuracy of meters is better than that of watches. It is a striking commendation that the principle of the gas meter, discovered in 1844, is still that in use today. Minor improvements have been made, but nothing better has been discovered. Gas companies don't make their own meters, they are made by people who have a pride in their product, the same as we all have in our own pet business. The usual things which happen to gas meters tend to make them read low rather than high. Learn to read your own gas meter, it is simple. Do it daily. If you are still from Missouri, visit the meter shop of your gas company; you will be welcomed. You will learn that a meter doesn't go around when gas does not pass through it, and also that it accurately records the gas which did pass through.

As a final word, the gas industry asks you to become better acquainted; it has nothing to be ashamed of or to hide. The gas industry feels that, when you are acquainted, you will realize:—

It is the big continuous business, always answering your reasonable demands.

That it supplies you with a community necessity.

That, in order to supply you, someone must invest money for apparatus devoted to your use.

That, in order to get more money to build for the community growth, its income from you must, at least, equal its outgo expenses—fair rates.

That the gas business is not an easy one to operate.

That it is under public control and does not make excess profits.

That, only through mutual friendship, can a helpful understanding be arrived at for the ultimate welfare of the community.

GENERAL

CHAIRMEN OF GENERAL COMMITTEES ORGANIZED TO DATE

Accident Prevention—CHARLES B. SCOTT, Chicago, Ill.
Calorific Standards—J. B. KLUMPP, Philadelphia, Pa.
Amendments to Constitution—WM. J. CLARK, Mt. Vernon, N. Y.
American Engineering Standards Committee, Representative on—A. H. HALL, New York, N. Y.—(Alternate Representative) W. J. SERRILL, Philadelphia, Pa.
Award of Beal Medal—D. D. BARNUM, Boston, Mass.
Chamber of Commerce, Representative in—CHARLES A. MUNROE, Chicago, Ill., National Councillor.
Cooperation with Educational Institutions—F. C. WEBER, New York, N. Y.
Finance—E. H. ROSENQUEST, New York, N. Y.
Gas Safety Code—W. R. ADDICKS, New York, N. Y.—(Alternate Representative) DONALD MCDONALD, New York, N. Y.
National Fire Protection Association—W. R. ADDICKS, New York, N. Y.
Rate Fundamentals—R. A. CARTER, New York, N. Y.
Rate Structure—J. D. SHATTUCK, Chester, Pa.
Standard Gas Appliance Specifications—W. T. RASCH, New York, N. Y.
United States National Committee of the International Commission on Illumination, Representative on—HOWARD LYON, Gloucester, N. J.
Nominating Committee—A. P. Lathrop, New York, N.Y.

Award of Beal Medal

THE Committee on Award of Beal Medal has issued a unanimous report awarding the medal to Mr. Frederick William Sperr, Jr., Chief Chemist of the Koppers Company, for his paper "The Seaboard Liquid Process of Gas Purification" presented before the Technical Section of the Association at the 1921 Convention in Chicago.

Mr. Sperr has been active in the technical work of the American Gas Association since its organization. He has served as a member of the Chemical Committee for the past two years during which he contributed extensively to the work of compiling the revised edition of the Gas Chemists' Handbook. In 1921 he served as Chairman of the Committee on Disposal of Waste from Gas Plants, presenting a most excellent report covering the Committee's activities in addition to acting as Chairman of Sub-Committee II of the Purification Committee. It was in this latter capacity that he prepared and presented the paper on liquid purification for which he was awarded the Beal Medal.

Mr. Sperr was born in Jefferson, Ohio, December 27, 1885 and was graduated from Ohio State University in 1906 with the degree of A. B. in Chemistry. His first position was as chemist with the

Westinghouse Electric and Manufacturing Company whom he left in 1908 to engage in civil and mining engineering. From 1910 to 1915 he acted as chemist for various by-product coke plants and commercial firms. Since 1915 he has occupied the position of Chief Chemist of The Koppers Company and in 1916 was made a Senior Fellow of the Mellon Institute. He is a member of the American Chemical Society, American Gas Association, American Society for Testing Materials and Franklin Institute.

In addition to his activities in this Association, Mr. Sperr has written technical papers on the following subjects:

By-Product Coke and Coking Operation—in collaboration with C. J. Ramsburg (Journal of the Franklin Institute, April 1917).

Recovery of Benzol from Gas (1917 Meeting American Institute of Chemical Engineers).

Notes on the Recovery of Toluol from Gas (Gas Age, May 1, 1918).

Laboratory Methods for Benzol—Recovery Plant Operation (Metallurgical and Chemical Engineering Nov. 1, 1915).

Some Characteristics of American Coals in By-Product Coking Practice. (Meeting of Franklin Institute 1918).

Recent Development in By-Product Oven Engineering—in collaboration with Joseph Becker (Blast Furnace and Coke Association 1920).

The By-Product Coke Oven in Relation to Natural Gas Supply—in collaboration with Messrs. Ramsburg and Becker (1920 Meeting Natural Gas Association).

By-Product Coking—in collaboration with E. H. Bird (Journal of Industrial and Engineering Chemistry).

Coke and By-Products as Fuels for Metals Melting (1920 Meeting American Institute of Mining and Metallurgical Engineers).

By-Product Research in the Gas Industry (Gas Age, Jan. 10, 1920).

It will be seen that Mr. Sperr has been very generous in contributing his time and knowledge to the technical development of the industry and we are sure that all our members will join most heartily in congratulating him on the recognition conferred on his recent paper.

Beal Medal Established in 1897

The Beal Medal is the greatest distinction which the Association can confer in recognition of the merits of technical papers presented at its Conventions. Committees on Award of this medal are appointed from the President and Past-Chairmen of the Technical Section and a very high standard is required in papers for which the medal is bestowed.

This recognition of unusual merit has been made possible by the generosity of Mr. T. R. Beal of Poughkeepsie, N. Y. The Beal Medal was first offered to the American Gas Light Association in 1897 by Mr. William A. Beal and the donation was perpetuated throughout the life of that Association and the former American Gas Institute. With the organization of the American Gas Association, Mr. T. R. Beal announced that the award of the medal would be continued, as a memorial to his father, and the award to Mr. Sperr is the second made since the American Gas Association was formed.

Since the organization of the American Gas Association the Beal Medal has been awarded twice. In 1919 to Mr. E. J. Brady, for the paper "A New Heating Value Indicator," Geo. B. Cortelyou Chairman of the Committee. There was no award in 1920.

Progress in Reduction of Fire Insurance Rates

P. A. WILSON
Chairman of the Fire Insurance Rates Committee

DURING the year 1920 representatives of the gas industry began negotiations with the fire insurance interests looking towards a reduction in rates on gas plants, due to the favorable loss experience as indicated by the records of a number of member companies of this Association.

After the preliminary work of bringing this matter to the attention of the Underwriters had been completed, the insurance companies checked their own records, with the result that it was found a reduction in rate would be in order.

This matter is now in the hands of Committees of the Central Traction and Lighting Bureau, which is the association of underwriters directly interested in the matter of fire insurance on gas, electric and traction properties, and the body responsible for the promulgation of rating schedules.

The following letter, which appeared in the New York Journal of Commerce on February 23rd, is the first public pronouncement made by this Bureau:

New York, Feb. 20, 1922.

Insurance Editor The Journal of Commerce:
Sir:

In order to correct misapprehension which appears to have been created in various quarters by a circular communication sent out by a committee chairman of the National Electric Light Association to the members of that body, the following letter has been sent out by the Central Traction & Lighting Bureau to the National Electric Light Association. The Central Traction & Lighting Bureau is composed of rating and underwriting associations and bodies, and aims to bring about consistent uniformity of treatment of the insurance on the properties of electric light, power and traction interests, also gas-making plants throughout the country.

Following is the Central Traction & Lighting Bureau letter, dated February 16, 1922, to the National Electric Light Association:

"Now that the work of revising the schedule for measuring the fire hazard of gas plants has been substantially advanced, and as the schedule for rating electric light and power stations are being thoughtfully considered with the idea of bringing about a downward revision of rates for the better types of these properties as a whole, the Central Traction & Lighting Bureau desires to record briefly the events preceding such action.

"The insurance companies have recommended such revisions based upon a study of their loss experience on the classes which experience they feel reflects in a large measure the co-operation shown by the owners of such properties in safeguarding and protecting fire hazards. This study was completed and action determined upon early in December, 1921, which fact becoming known, occasioned the National Electric Light Association to issue circular letters to their entire membership, dated December 17, 1921, to the effect that they had secured such reduction of rates, and stating further that they 'had been able to bring about an immediate reduction of fire insurance rates on power houses and sub-stations,' and that they had been greatly aided by a representative of an insurance brokerage house.

"Perhaps it is quite natural that anyone who brought this matter to our attention, namely, the possible propriety of a reduction in rates on gas and electric properties, and one who had no knowledge of other similar requests made at about the same time or at prior dates, should have considered himself responsible for such a reduction if and when it took place. No doubt everyone contributing valuable data on the subject rendered assistance in the matter of arriving at a conclusion. However, it is a fact in this instance that when the suggestion of the committee of the National Electric Light Association was received, such consideration was well under way toward the reaching of a conclusion, this being partly based on the statistics received from various sources during the year preceding.

"Inasmuch as a great many agents, and brokers throughout the country have to do with gas works and electric power stations, they will be interested in knowing that this movement for a revision in rates was contributed to by many, for the helpfulness of all of whom we have an appreciation, and that many assured and agents had taken the matter up and filed their data in the year preceding the negotiations of the committee of the National Electric Light Association."

ELLIOTT MIDDLETON.
Secretary, Central Traction & Lighting Bureau.

It will be seen that work of revising the schedule used in rating gas plants has been substantially advanced.

The Insurance Committee of this Association has been in close touch with this situation and at the proper time further announcement will be made to member companies which will enable them to take advantage of the reduction in rates. Until such time as the Committees in charge of this work can complete their labors there will be nothing for member companies to do, as local rating boards can do nothing until the new schedule is placed in their hands. For that reason this Association has made no announcement concerning the matter, as it was thought that confusion might result and the work of the Committees be hampered, but as the Secretary of the Central Traction and Lighting Bureau has made this public announcement there seems no reason for withholding the information longer.

IN MEMORIAM

Mr. John F. Smith, Vice-President and Treasurer of the Superior Meter Company of Brooklyn died on Wednesday, March 8th, 1922.

Extension of Service by Gas Companies

Reprinted from Public Utility Reports Vol. 1921E No. 3

The first case published in Public Utilities Reports was a gas case dealing with the interesting question of priority in time of extensions of gas service, where a number of applications were in the hands of the company. The company objected to making the particular extension asked for until earlier applicants had been taken care of. The question raised by the company was not decided, however, because of lack of certain evidence, and the extension was ordered on general principles.[1]

[1]Hardison v. Los Angeles Gas & E. Corp. (Cal.) P. U. R. 1915 A, 1.

The question of how far gas companies may be required to extend their mains for the purpose of serving new consumers, has been up for determination by the Commission many times. It seems to have been a most fertile source of litigation. No absolutely definite rules can be laid down to cover all cases. In general, it may be said that a gas company enjoying the benefit of a monopoly and protection from competition, must, like other utilities, be prepared to extend their service to applicants therefor; and it has even been held that refusal to make the extensions asked for is not justified on the ground of the difficulty of obtaining necessary capital,[2] or that streets have not been legally opened or dedicated[3] or, in

[2]Public Utilities Commission v. St. Clair County Gas & E. Co. (Ill.) P. U. R. 1921 B, 47.

[3]Bianco v. Brooklyn Union Gas Co. (N. Y.) P. U. R. 1920 C, 991.

the case of a natural gas company, that the supply is problematical.[4] At least, this would undoubtedly be the rule, if the revenue to be obtained were sufficient to justify the extension and maintenance.[5]

[4]Lucore v. St. Marys Gas Co. (Pa.) P. U. R. 1918 C, 445.

[5]Ball v. Public Service Gas Co. (N. J.) P. U. R. 1915 B, 173.

Reasonableness of Demand

The duty of making service extensions is, of course, not absolute, but depends upon the reasonableness of the demand in the particular case.[6] The Commissions which have adopted standards of service have usually provided that service mains shall be extended a prescribed

[6]Warren v. Pacific Gas & E. Co. (Cal.) P. U. R. 1915 A, 702; Haines v. Colorado Springs Light, Heat & P. Co. (Colo.) P. U. R. 1916 A, 282; Ulrich v. Eastern Pennsylvania Light, Heat & P. Co. (Pa.) P. U. R. 1917 D, 453; People ex rel. New York & Q. Gas Co. v. McCall, 245 U. S. 345, P. U. R. 1918 A, 792, 62 L. ed. 337, 38 Sup. Ct. Rep. 122; Arizona Corp. Commission v. Pacific Gas & E. Co. (Ariz.) P. U. R. 1915 A, 996; Public Utilities Commission v. St. Croix Gaslight Co. (Me.) P. U. R. 1916 A, 404; Zeilda Forsee Investment Co. v. St. Joseph Gas Co. (1917) 195 S. W. 52, P. U. R. 1917 E, 943; St. Joseph v. St. Joseph Gas Co. (Mo.) Case No. 1229, Sept. 17, 1917, P. U. R. 1917 F, 743; Sigrist v. Public Service Gas Co. (N. J.) P. U. R. 1915 A, 1024; South Amboy v. Public Service Gas Co. (N. J.) P. U. R. 1917 E, 943; People ex rel. New York & Q. Gas Co. v. McCall (N. Y.) P. U. R. 1916 D, 91; Moore v. Pavilion Natural Gas Co. (N. Y.) P. U. R. 1916 E, 223; First Mortgage & Real Estate Co. v. Westchester Lighting Co. (N. Y.) P. U. R. 1921 B, 178; Moore v. Pavilion Natural Gas Co. (N. Y.) P. U. R. 1916 E, 223; Draney v Central Hudson Gas & E. Co. (N.Y.) P. U. R. 1916 F, 544; Patterson v Oklahoma Gas & E. Co. (Okla.) Case No. 2650, Order No. 1168, Nov. 11, 1916 (P. U. R. 1917, 943); Ulrich v. Eastern Pennsylvania Light, Heat & P. Co. (Pa.) P. U. R. 1917 D, 453.

distance at the expense of the company and beyond that at the expense of the consumer. Under rule 19 of general order No. 20 of the Illinois Commission, for example, a gas company was required to make extensions free of charge where the proposed extension does not exceed 100 feet per prospective consumer by the shortest distance from existing main, although it might be necessary to increase the capacity of such main in order to render adequate and satisfying service to the consumers.[7] The companies themselves have rules covering extensions, the reasonableness of which may come before a Commission. In one case the Illinois Commission held that a rule of a gas utility requiring new consumers to pay for the cost of extending the gas main in excess of a distance of 300 feet per consumer, which is rebated as additional consumers are connected to the extension, is reasonable and equitable as applied to a village containing scattered residences.[8]

[7]Public Utilities Commission v. Granite City Gas Light & Fuel Co. (Ill.) P. U. R. 1919 F, 654.

[8]Creutz v. Western United Gas & E. Co. (Ill.) P. U. R. 1915 E, 902.

But the question whether the company shall be required to make any part of the entension depends upon the reasonableness of the demand for it. The broad general rule is that the

company must make reasonable extensions.[9] It cannot pick out favorable parts of its territory and refuse service into other areas;[10] for it is unnecessary that extensions of service shall be uniformly profitable.[11] The cost of the extension is not the only factor to be considered, particularly where the company is the only one which has a franchise to serve the community.[12] So it has been held that a utility may be required to make an extension that

[9]Arizona Corp. Commission v. Pacific Gas & E. Co. (Ariz.) P. U. R. 1915 A, 996.

[10]Re New York & Q. Gas Co. (N. Y.) P. U. R. 1915 B, 821; Ulrich v. Eastern Pennsylvania Light, Heat & P. Co. (Pa.) P. U. R. 1916 A, 1081.

[11]Re Pacific Gas & E. Co. (Cal.) P. U. R. 1915 A, 722; Lofgren v. Pacific Gas & E. Co. (Cal.) P. U. R. 1916 E, 1003; Lucore v. St. Marys Gas Co. (Pa.) P. U. R. 1918 C, 445.

[12]Re Woodhaven Gas Light Co. (N. Y.) P. U. R. 1920 C, 904.

will not be immediately profitable, if the prospects of future business are reasonably good,[13] and that gas mains should be extended into thinly settled territory although a return of 9 per cent on the investment for interest and depreciation may be inadequate, where the extensions will induce the territory to grow and will be ultimately profitable;[14] and that a company will be required to extend its mains to serve new consumers, where it appears that it has a monopoly, that substantial development may reasonably be expected in the territory, that the extension is necessary to secure reasonably adequate service, and that it can be made without financial loss by using smaller mains than those suggested by the utility.[15]

[13]Re Maple Hill (Conn.) P. U. R. 1916 B, 308.

[14]Sharp v. Oklahoma Gas & E. Co. (Okla.) P. U. R. 1916 D, 100.

[15]Eaton v. Oklahoma Gas & E. Co. (Okla.) P. U. R. 1916 A, 193.

Liberal Policy Required

There should be a liberal policy as to extensions but due consideration should also be given to the financial condition of the company and the rights of existing consumers.[16] It has been held that a gas company cannot be required to extend its mains to a street, even in a central portion of a city, where a reasonable demand or prospect for such service is not shown to exist;[17] and that extension of gas mains will not be required where the service would be given at a considerable loss without any prospect of growth of the community for additional consumption.[18] The extension must not be unduly burdensome.[19] If the company deems it to be so, it is a matter to be referred to the Commission.[20]

[16]Re Water, G. E. & T. Utilities Requiring Deposits (Cal.) P. U. R. 1915 E, 717.

[17]Fred-Palmer-Poroner v. Consumers' Gas Co. (Pa.) P. U. R. 1918 A, 649.

[18]Perkins v. Bristol-Plainville Tramway Co. (Conn.) P. U. R. 1917 E, 943.

[19]Re Water, G. E. & T. Utilities Requiring Deposits (Cal.) P. U. R. 1915 E, 717.

[20]St. Joseph v. St. Joseph Gas Co. (Mo.) P. U. R. 1916 E, 204.

Guarantee of Revenue

If the prospective income from a proposed extension is insufficient to warrant its construction, the company may require an adequate revenue to be guaranteed before the laying of the main. The Colorado Commission has held that before extending its mains to serve a tenant house facing a side street, a gas company may demand a guaranty that enough gas will be used in three years to cover at least the actual cost of construction, it appearing that there is no other necessity therefor, and that it is extremely doubtful whether other houses will be built on such street;[21] and in California, a gas company was required to extend its mains to serve residents in an outlying section upon condition that applicants guarantee for three years a minimum charge sufficient to meet their proportion of the operating expense and 10 per cent of the cost of the extension to cover interest and depreciation thereon, where the prospective revenue would not justify an extension under ordinary conditions;[22] and, in the same jurisdiction, an extension of service contract between a gas and

[21]Haines v. Colorado Springs Light, Heat & P. Co. (Colo.) P. U. R. 1916 A, 282.

[22]Lofgren v. Pacific Gas & E. Co. (Cal.) P. U. R. 1916 E, 1003.

electric company, and certain prospective customers, by which the company and the customers each agreed to construct a portion of the lines, the customers guaranteeing a yearly minimum return, was approved until such time as the cost and conditions of the service should be investigated by the Commission.[23]

A requirement that a prospective customer guarantees to use a specified amount of gas, as a condition precedent to the extension of mains, is not, in substance, a regulation compelling him to pay for permanent additions to the company's plant.[34]

[34]Re Pacific Gas & E. Co. (Cal.) P. U. R. 1915 A, 722.

[35]Haines v. Colorado Springs Light, Heat & P. Co. (Colo.) P. U. R. 1916 A, 282.

Construction by Consumers

But in normal times, at least, consumers will not be required to construct the extension at their own expense, or to make a deposit sufficient to cover the cost of construction to be repaid by the utility, since this amounts to an enforced loan to the utility and is an incorrect way of procuring capital.[35] It has been held that to require petitioners for a necessary and reasonable extension of gas service to advance the cost of the main, and to bond themselves to continue the use of gas for a definite period, would be of doubtful justice where complainants are not the sole beneficiaries of the proposed extension.[36]

However in denying a petition for approval of a service rule requiring consumers to advance the cost of all new extensions until such time as the ready sale of public utility securities to the public facilitates the financing of such extensions, Chairman Jones of the Arizona Corporation Commission said: "We are not convinced that a hard and fast rule governing this matter will work to the best advantage of either the public or the utility company. There may arise extraordinary situations calling for extensions to schools, hospitals, or plants producing food and other commodities needed by the Government, and we are of the opinion that this matter can best be handled by making each case a special case to be considered upon its merits."[37]

[36]Re Consolidated Gas, E. L. & Pr. Co. (Md.) P. U. R. 1921 D, 5.

[37]Wickett v. Judge (N. Y.) P. U. R. 1919 A, 594.

[38]Re Pacific Gas & E. Co. Docket No. 560, Nov. 8, 1918 P. U. R. 1919 A, 597.

This method of making extensions was sometimes allowed during the war.[38] If permitted, an applicant's payment for an extension of a gas main should be considered as a loan to the utility, to be repaid under reasonable conditions and to bear interest at 6 per cent.[39] It has been held in Wisconsin that a change in the amount of deposit required as a condition precedent to the extension of mains beyond the limit required by franchise should not be made without filing the same with the Commission, and that a deposit required for the extension of mains beyond the limit required by franchise, of less than the actual cost of laying a 4-inch main, the smallest size used by the company, is reasonably liberal.[40] The New Jersey Commission has said that in calculating the expense of service for gas extensions, it is not necessarily correct to compute the return on the capital required on the basis allowed for a utility as a whole; since each extension, considered separately, may have a development period, just as the utility as a whole, during which interest should be computed on an ordinary interest basis.[41] The business should not be charged with the cost of the mains back to the works, it being necessary to consider only the cost of the new transmission line to the new territory.[42]

[39]Re Pacific Gas & E. Co. (Ariz.) Docket No. 558, Nov. 8, 1918. P. U. R. 1919 A, 597.

[40]St. Joseph v. St. Joseph Gas Co. (Mo.) P. U. R. 1916 E, 204.

[41]West Allis v. West Allis Gas Co. (Wis.) P. U. R. 1919 F, 370.

[42]Florence v. Public Service Gas Co. (N. J.) P. U. R. 1918 B, 853.

[43]Re New York & Q. Gas Co. (N. Y.) P. U. R. 1915 B, 821.

Territory to be served

The company may be required to make extensions in unincorporated territory at its own expense, with the usual proviso that where it deems an extension unduly burdensome the matter may be referred to the Commission for adjustment.[43] And a company, having a franchise to use all the streets of a town, has the duty, under subdivision 1 of Sec. 65 of the New York Public Service Commissions Law, to make a reasonable extension to one on a highway not used by the utility, although it only agreed in the franchise to supply those "in front of whose premises such gas main shall be laid."[44]

It has been held that the Connecticut Commission has jurisdiction of a petition for extension of service to a portion of territory which the company is authorized by its charter to serve, although it has never undertaken to furnish service or exercise its franchise there-

in.[35] But the Oklahoma Commission has no authority to require the extension of natural gas pipe lines except where the gas companies have a franchise and have agreed and undertaken to supply certain towns or communities with gas.[36] The Commission said: "Where citizens construct a pipe line to a gas well or any other pipe line in use, the Commission will require the connection and order the service, and in towns where a gas company has a franchise, or out of towns where it has by its practices undertaken to supply a certain community, will order reasonable extensions and the service." In Indiana, the extension of facilities in municipalities is within the original and exclusive jurisdiction of municipal councils, and the Commission has jurisdiction only to review the act or failure to act of such councils.[37]

[35]Re Water, G. E. & T. Utilities Requiring Deposits (Cal.) P. U. R. 1915 E, 717.

[36]Moore v. Pavilion Natural Gas Co. (N. Y.) P. U. R. 1916 E, 223.

[36]New Britain Gaslight Co. v. Root (Conn.) P. U. R. 1917 C, 102.

[36]Nunn v. Western Natural Gas Co. (Okla.) P. U. R. 1917 E. 943 (Anno.)

[37]Fisher v. Northern Indiana Gas & E. Co. (Ind.) P. U. R. 1919 E, 683; Board of Public Works v. Laporte Gas & E. Co. (Ind.) P. U. R. 1920 D, 497.

Jurisdictional questions

Purely legal questions with reference to proposed extensions are within the jurisdiction of the courts and not the Commissions. For example, the question whether a charge of a township for permitting a gas company to cut through a pavement in order to extend service to a prospective customer is a proper regulation, is legal, is excessive, and, if legal, by whom payable, are for the courts to decide and not the Commission.[38] And under the New York Public Service Commissions Law, the court has power to pass upon the reasonableness of extensions of gas service ordered by the Commission.[39] The Commissions undoubtedly have power to compel a gas company to make connection with the residences of persons residing upon a street in which the company has its mains.[40]

[38]Bennett v. Public Service Gas Company (N. J.) P. U. R. 1921 B, 301.

[39]People ex rel. New York & Q. Gas Co. v. McCall (N. Y.) P. U. R. 1916 D, 91.

[40]Re Pleasantville Gas Co. (N. J.) P. U. R. 1920 E, 404.

The Company's obligation

It has been held that it is a reasonable requirement that utilities should make, at their own expense, all service connection of normal size from their mains or lines along public highways to the property lines of abutting consumers, except that connection may be refused, subject to review by the Commission, if the utility believes that such extensions will not be used in the reasonably immediate future;[41] and that safe, adequate, and proper service to be rendered by a gas company is not afforded where it refuses to connect with its mains the premises of those who reside along the streets upon which it has been granted a franchise to lay its mains.[42] But a natural gas company, it has been held, cannot refuse to render service to an applicant merely because it does not have a charter right to serve the borough in which the applicant is located, where it has a distribution main on the street upon which the premises of the applicant are located, and has made connections in the borough with new patrons since the applicant made his application.[43] And it seems that the company is not justified in refusing to make service connections for an applicant owning premises upon a street in which it has a distribution main, merely because there was some evidence that its supply was diminishing and if the applicant was sustained others might apply for service.[44]

The submission of an application for an increase in rates has no bearing upon the duty of a gas company to make a connection with a residence upon the street in which it has its mains.[45] And the fact that a municipal waterworks compels consumers to pay the entire cost of installing service pipe from main to meter does not justify a private gas utility in requiring service installations on the same basis.[46] And it has been held that the service pipe

[41]Re Water, G. E. & T. Utilities Requiring Deposits (Cal.) P. U. R. 1915 E, 717.

[42]Re Pleasantville Gas Co. (N. J.) P. U. R. 1920 E, 404.

[43]Bilusick v. United Natural Gas Co. (Pa.) P. U. R. 1919 D, 790.

[44]Ibid. Public Service Commission v. Iroquois Natural Gas Co. (N. Y.) P. U. R. 1920 A, 671.

[45]Re Pleasantville Gas Co. (N. J.) P. U. R. 1920 E, 404.

[46]Curtis v. Elmira Water, Light & R. Co. (N. Y.) P. U. R. 1918 D, 41.

(Continued on page 254)

Here and There with the Section

STILL another Committee on Public Utility Information—the State of Washington. The committee will operate as soon as a director is appointed. It looks as if Tennessee would be the next State to fall in line, and Pennsylvania and New York may follow. Counting Washington there are now fourteen committees in action.

Twelve new Chat ads will be issued to our membership on the 23rd of this month. This new set will make forty-eight ads that have been issued so far. Companies everywhere are reporting success with them.

Consumers of gas in Fort Wayne, Indiana, will see the following message on their March gas bills: "Our employees are told and trained to give a little better service than you would reasonably expect. If they do not, tell us. If they do, tell others." Why not print a little goodwill message each month on your gas bills? We who are in the gas business have the most valuable mailing lists to be found anywhere. Let's make good use of them.

According to the newspapers, Mrs. James J. Hill, during the years 1916 to 1919, disposed of heavily taxed securities and substituted tax-free holdings in their place. In this way she increased her annual income from $365,000 to $730,000 a year. In other words, she doubled her net returns. Evidently, Mrs. Hill does not care much about public utility securities.

"Public utilities are not saints in disguise nor are they devils in fact," comments a newspaper on the voluntary reduction in rates put into effect by the New Haven Gas Light Company. "They are human like the rest of us, but they have this advantage. They can attract public confidence by treating their consumers with a full consideration for the mutual interest involved. They have lost in the past by not doing so when they could easily; they have invariably

gained when they have tried the experiment."

In an article in the New York World for February 27th, Henry L. Doherty says that when standards become more flexible the consumer will have cheaper gas. "Although conditions have entirely changed," he says, "we are still working under the same standards created at a time when gas was used exclusively for illuminating purposes and in open burners."

In his first bulletin to the newspapers, Joe Carmichael, director of the newly-organized Iowa Committee, says: "This committee believes that it takes a step in the right direction in telling the public more about the public utility industries in which all are so vitally interested. It believes, further, that in establishing a bureau for the dissemination of information concerning the utility companies, it is going a considerable part of the distance towards promoting fuller understanding of the utility business to the mutual benefit of the companies and the patrons."

A recent newspaper clipping says that the A.G.A. "at its convention in London, England, was addressed by Charles A. Munroe of Chicago."

Some of our manufacturer company members are blossoming out in fine fashion in the national magazines with a style of advertising that does the industry credit. These companies are doing splendid missionary work in putting sick business back again on its feet, and their reward is not very far off, you may be sure.

John N. Cadby of the Wisconsin Association asks: "Who else in your town is spending money to advise people how they can save the product the advertiser is selling by using it more economically? Many of our gas companies are doing fine work that in the long run will make satisfied customers. As he mingles with his fellow business men the gas manager might well let them know that he is setting a new pace for them in the way of broad-gauge publicity."

Our motion-picture film and our illustrated lecture on gas are in constant circulation. Let us hear from anyone who can use them.

Leake Carraway, member of the Managing Committee of the Publicity and Advertising Section and director of publicity for the City Gas Company of Norfolk, Virginia, died at his home in Norfolk on February 10, after a lingering illness.

Mr. Carraway was an experienced newspaper man and an indefatigable worker for better public relations between utility companies and the public. This work brought him in close touch with the members of the three national utility associations and the Southern Gas Association, of which he was chairman of the publicity committee. Previous to his affiliation with the Norfolk Company, he was director of public relations for the Virginia Railway and Power Company and the Southern Utilities Company.

Where Can You Get Such Value?

Did you ever stop to consider that in point of convenience your gas service is one of the greatest money values you can buy today?

Take a family of five persons living in an eight-room house and using gas service exclusively for a typical winter's month. What is the probable record of service performed?

90 meals cooked in about 75 hours, a saving in time of at least two full days over the old coal stove.

4,000 gallons of water heated automatically.

250 hours of eye-comforting illumination.

Heat for the entire house, either room heaters or central automatic heating boiler.

No coal, no smoke, no ashes, no soot, no fumes, no stove or furnace feeding.

Saving effected in linens, draperies, rugs, upholstery, wall paper, furniture and clothes.

Strength and health conserved, the atmosphere made wholesome, drudgery eliminated, leisure assured.

Yet for all these manifold benefits, the average bill for gas service is one of the least expensive items, one of the smallest necessary outlays, in the household budget.

Think it over: Is there any other service at your disposal that gives so much for so little money as this one?

(Insert the name of your Company here)

MEMBER OF THE AMERICAN GAS ASSOCIATION

Good Will Advertisement Number 24

The Normal Way of Doing Business

TODAY'S advertising appropriation will determine to an extent larger than most of us realize just how big a slice of profitable business is going to come our way when the highly competitive buyer's market is in full swing.

Leaders in the gas industry know this to be only too true, for witness the effective national advertising that the manufacturers are doing and the newspaper space that is being used by those companies which have a strong, aggressive sales policy backed by an equally aggressive advertising program.

There is nothing new in the combination of sales aggression and merchandise advertising. They go hand in hand. It is the *normal* way of doing business. The pity is that so many know this but so few put it into practice. Yet our regulatory bodies look favorably on strong sales and advertising work. Only recently the chairman of one of our best known commissions intimated that it was up to the companies to sell themselves and their service to the people. He said he was heartily in favor of advertising and considered it to be a legitimate expense.

Advertising, therefore, needs no defense.

As merchandisers of gas service and gas-burning appliances, however, we are a greatly under-advertised industry. The result is a vast, unsold market. In the year 1920, for example, 140 gas company members of the American Gas Association whose total gross sales of gas, exclusive of appliances, was $98,665,000 spent $843,120 for advertising.

In other words, as we have figured it out, 140 gas companies appropriated for advertising 85/100 of 1 per cent of their total gross sales of gas, or eighty-five cents out of every hundred dollars. This is not so bad—not nearly so bad as many of us would have believed before these figures were made public. But suppose we were sufficiently enlightened as an industry to spend one dollar out of every hundred dollars taken in. We would then find the 966 gas companies of the United States appropriating $3,840,000 for advertising—a sum that would put us on the advertising map in great, big letters.

Of course there are those who will laugh at an advertising appropriation as low as one per cent but they are generally unfamiliar with the restrictive character of the public utility business and fall into the common error of comparing our business with the venders of toothpaste and chewing gum. We have nothing in common with the toothpaste and chewing gum people. Because they spend from five to twenty-five per cent for advertising, is no reason why we should. How much would they spend with a five-year turnover, commission regulation and a maximum return of eight per cent? Nothing at all—they couldn't survive.

An advertising appropriation of one per cent, therefore, would put us in the clear. With $3,840,000 to work with through the medium of newspaper white space, with copy full of facts and with each message specific and aimed at specific prospects—and all of this backed up by the national advertising of the manufacturers—we could make a big

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COMMERCIAL SECTION

A. P. POST, Chairman — WILLIAM GOULD, Vice-Chairman

LOUIS STOTZ, Secretary

MANAGING COMMITTEE—1922

At Large

BEAL, A. R., Poughkeepsie, N. Y.
CAULEY, F. F., Chicago, Ill.
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LONG, H. J., New Brunswick, N. J.
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SHATTUCK, J. D., Chester, Pa.
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Representing Affiliated Societies

BURKE, E. J., Indianapolis, Ind. (Indiana)
CAMPBELL, E. C., Benton Harbor, Mich. (Michigan)
CLARK, H. H., Chicago, Ill. (Illinois)
COEL, WILEY F., Mexico, Mo. (Missouri)
CRAFTS, H. C., Pittsfield, Mass. (N. E. Gas Eng.)
CRANKSHAW, J. WARD, Allentown, Pa. (Pennsylvania)
DOERING, H. A., Mt. Vernon, N. Y. (Empire State)
FISHER, R. E., San Francisco, Cal. (Pacific Coast)
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HANLAN, J. P., Newark, N. J. (New Jersey)
JOHNSON, W. B., Toronto, Ont., Canada. (Canadian)
ST. JOHN, JOHN, Madison, Wisc. (Wisconsin)
TAYLOR, W. H., Omaha, Nebr. (Iowa District)

CHAIRMEN OF SECTION COMMITTEES ORGANIZED TO DATE

Contributions to Monthly—Representatives, Affiliated Societies
Industrial Sales—F. F. CAULEY, Chicago, Ill.
Retail Pricing—
Sales Stimulation—WM. GOULD, Boston, Mass.
Educational Pamphlets (Sub.)—J. P. HANLAN, Newark, N. J.
Merchandise Advertising (Sub.)—J. E. DAVIES, Chicago, Ill.
Window Displays (Sub.)—

Window Display Service

There is reproduced in the adjoining column the cover page design of a 32-page book which contains 47 carefully selected suggestions for gas merchandising displays under the following headings:

Gas Cooking Displays.
Gas in the Kitchen.
Gas Laundry Displays.
Gas Lighting Displays.
Hot Water Displays.
Gas Heating Displays.
Seasonable Displays.
Canning Time Displays.
Industrial Displays.
Patriotic Window Displays.

This is more than a mere collection of photographs—it is a SERVICE and is designed primarily to assist in the designing of displays that will bring results.

The Association will also loan members photographs from its comprehensive collection of all types of gas window displays.

PRICE—$2.00 DELIVERED

Water Heating

The Big Unsold Field for Gas Companies

PLANS, SUGGESTIONS, FEATURES FOR REACHING THE GAS INDUSTRY'S GREATEST UNSOLD MARKET

Prepared by the

AMERICAN GAS ASSOCIATION

130 East 15th Street, New York, N. Y.

The Automatic Water Heater is the appliance toward the selling of which the most aggressive and continuous efforts of the gas company should be directed. It is the appliance which fills the greatest unsold market, promises the greatest increase in send-out while efficiently serving and being adaptable to all classes of consumers.

The Managing Committee of the Commercial Section, realizing that an increase of gas consumption by present consumers is more desirable than sales secured from new consumers which entail additional capital expenditures, is convinced that the largest unsold market in the domestic field is that of "GAS HOT WATER" and that the sale of automatic heaters, giving hot water service commensurate with the highest standard of household appliances, should receive from this time on **a continuous** and **major** effort by the member companies.

In this connection the practical and desirable caution is given that water heaters equipped with burners that use large quantities of gas within very short periods, be installed only after due engineering consideration has been given to main conditions, meter capacity, gas pressure and kindred auxiliary matters.

There are but 1,500,000 gas water heaters of all types installed on the lines of gas companies whereas nearly 7,000,000 gas cooking appliances are doing service so that it requires but little stretch of the imagination to see the wonderful possibilities in gas sales from the intensive cultivation of this unlimited field.

Have you as many automatic water heaters in your town as there are automobiles or pianos, or victrolas? If you have not, here is a worthy goal for your efforts.

The 5,000,000 unsold gas water heater prospects will buy if the proper merchandizing effort is put forth and there is every indication that gas companies throughout the country are again getting into the stride of intensive sales effort.

This is then the psychological moment to get your sales plans under way.

WHAT TO DO

Prospect List

Prepare an accurate list of all your present consumers without gas water heaters. Keep this record up-to-date and use it for circularization purposes and for your sales representatives in their canvassing.

Circular Letters, Advertising and Displays

Suggestions of subjects which may be covered in advertising copy or circular letters—

Sufficient hot water available at all times at a definite temperature—never too hot.
Hygiene, comfort, convenience.
Hot water an all-year necessity—day and night.
The Bath-a-Day idea so universally advocated nowadays.
In case of sickness.
After an automobile trip or travel.
Immediately available—no dirt or labor as in the case of a coal stove.
Special uses for particular prospects, such as manufacturing plants, doctors, dentists, laboratories, restaurants, barbers, hairdressers, etc., etc.

Make generous use of advertising space in your local papers. A combination of service and merchandising copy is usually a most effective and interesting method of telling your story.

Window displays should be planned to tie in closely with newspaper and other advertising copy.

Displays should be changed often and be designed to convey a service message or use of gas.

Proofs of framed newspaper ads and other display cards add value to the window display.

Window or show room working demonstrations should be made of water heaters. Placards should be placed to give information as to what the heater will do; this is always a convincing method of demonstration.

The manufacturers all have attractive booklets, window cards, display suggestions and other advertising material which are available to gas companies for the asking. Make use of this material—it has been prepared by experts who know how to sell goods.

Use the company's wagons, fencing and other conspicuous places for display of placards and other advertising.

Special Inducements

There are any number of special inducements which may be made to customers, the utility of which are more or less governed by local conditions—among them may be mentioned special discounts for limited periods; small initial payment and extended monthly terms; premiums and other features which will suggest themselves as feasible.

Selling Your Own Organization

It is important to enthuse the entire organization in such a sales effort. A careful canvass should be made of all employes to ensure that they have the proper water heater installation in their own homes. The sale of water heater service requires more than ordinary sales ability. The matter of a satisfied customer is of great importance to the company, therefore the sales representatives should be required to become familiar with each type of water heater handled by the company and be able to recommend to the customer only the appliance which will ensure satisfactory service. It is also highly important that the installation be made promptly and properly.

The entire personnel of your organization should be encouraged to bring in leads for water heater prospects. This may be done by offering prizes for the largest number of prospects to whom sales are made, by splitting commissions and in various other ways which will occur to the management as feasible or desirable.

Cooperation with Plumbers

Local plumbers can be a great aid in extending the use of gas for water heating or they can be largely influential in recommending coal stoves. Individually this influence may not count for much but collectively it is quite a factor and will be felt one way or the other by the gas company. It is suggested that the plumbers should be individually interviewed and made acquainted with the company's plans and some cooperative arrangement entered into which will be reciprocally beneficial to both the gas company and the dealer.

When to Start—

NOW

For How Long—

UNTIL you get 100% of your consumers heating water by gas.

The following advertising and display suggestions will be found helpful in planning your publicity. These advertisements and window displays are merely suggestive of what may be done. The association will supply at actual cost stereotype or matrix of the illustrated portions of these advertisements. Use any part or all of the type matter and change to suit your own ideas, including prices, terms or special offering you wish to make.

Single Column Newspaper Illustrations

Matrix No. 1 Price .25
Stereo No. 1 Price .50

Matrix No. 2 Price .25
Stereo No. 2 Price .50

Suggestion for circular or original communication, written on company letterhead, addressed to selected prospects.

Dear Madam or Sir:

A Bath a Day!

Hon. Herbert Hoover, Secretary of Commerce, says it's the only way to keep the body fit. Government health authorities agree with him. So do thousands of reputable physicians.

On the strength of such recommendation, why not acquire the Bath-a-Day habit yourself? It's the cheapest kind of health insurance on the market, especially when you have an Automatic Gas Water Heater to do the work for you.

Think of hot water running at your faucets?

Hot water when you want it, where you want it, as much or as little of it as you wish and at just the right temperature.

That's what an Automatic Gas Water Heater means.

Nothing will bring more downright comfort and convenience into your home every day of the year than running hot water.

Act now! Install a modern, labor-saving hot water heater in your home and keep fit by taking a Bath-a-Day.

A telephone or post-card request will bring our representative promptly, or better yet visit our office at Street and look over our complete line and let us advise with you as to your requirements.

Yours very truly,

THE GAS COMPANY

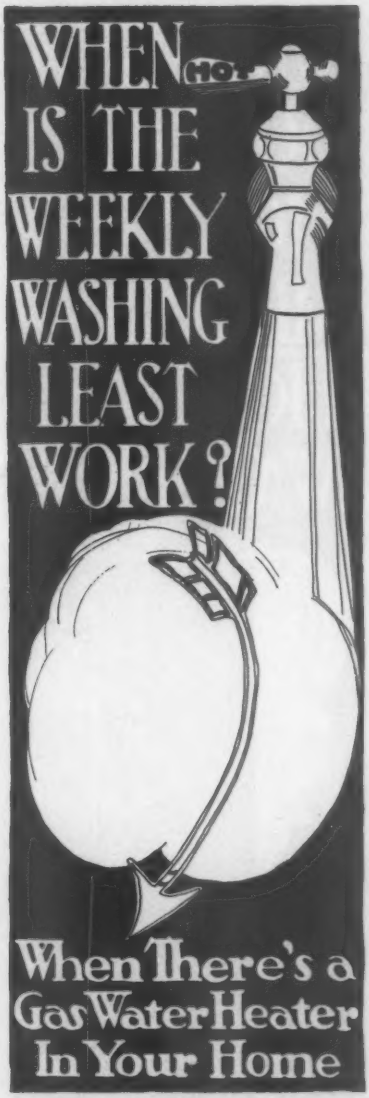
BY_____

Title_____

(It is recommended that letters of this character be signed by the Sales Manager.)

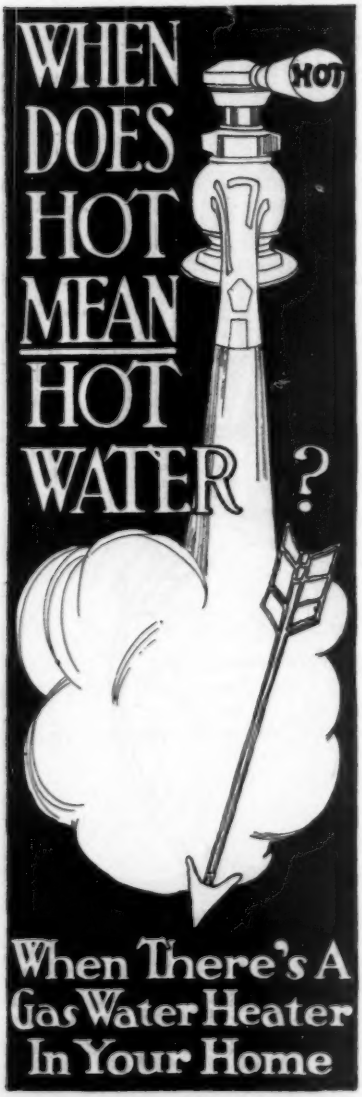
Single Column Newspaper Illustrations

Matrix No. 3 Price .25
Stereo No. 3 Price .50



Matrix No. 4 Price .25
Stereo No. 4 Price .50

Single Column Newspaper Illustrations



Matrix No. 5 Price .25
Stereo No. 5 Price .50

Matrix No. 6 Price .25
Stereo No. 6 Price .50

DISPLAY SUGGESTIONS

Two or Three-Column Newspaper Advertisement

Running Hot Water!

—Gas Heated

—A Priceless Boon to Your Home Comfort

—At every faucet
—At any hour
—In any amount

You Simply turn the faucet

Gas Water Heater

You can have it Now! The cost is small indeed!

WITH the modern Gas Water Heater in your home your hot water troubles are at an end. You can have all the hot water you want—or as little as you want—flowing from your faucets steaming hot — without delay and without work. Here's service for you! Here's convenience for you! And that's what every modern housewife wants.

Undoubtedly you cook with gas. Would you go back to less convenient cooking methods? You'll get just as much service and fully as much satisfaction from a Gas Water Heater as you now obtain from your Gas Range.

NOTE!

Put in this space illustration of the particular type of gas water heater you wish to call attention to. Water Heater Manufacturers will be glad to supply cuts desired without charge.

TELEPHONE

NOW! We'll gladly send our representative to explain this great offer in detail.

TERMS

Feature in this space the terms or special offer you wish to make.

THE GAS COMPANY

(Insert Company's Address)

Kindly remember that in these advertisements we furnish matrix or stereotype of the illustration only.

Thus you can alter the copy to suit your particular requirements.

Be sure to order by size and by number.

Postage accepted.

Two-column stereo No. 7 Price .50
Two-column matrix No. 7 Price .25

Three-column matrix No. 7 Price .25
Three-column stereo No. 7 Price .75

Two or Three-Column Newspaper Advertisement

Hot Water—

One Thing You Can't Get Along Without

Have It Flowing Hot from Your Faucets

YOU can, of course, heat it in the teakettle, if you wish, just as you can light your home with a flickering candle. But there's a newer, better, more efficient, labor-saving way and housewives who value their time and strength will accept no other method in their homes.

A Gas Water Heater

providing real hot water service will be the biggest possible boon to your home comfort. It will give you hot water when you want it and where you want it without fuss or muss and at a cost of but a few cents for a tubful.

Telephone now. We'll gladly give you full particulars.

THE GAS COMPANY

(*Insert Company's Address*)

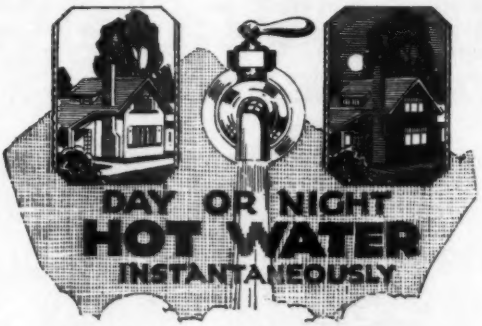
Put in this space the terms or special offer you are making.

Put in this space a cut of the particular type of heater you are selling. Water Heater Manufacturers will supply same without charge.

Three-column matrix No. 8 Price .25
Three-column stereo No. 8 Price .75

Three-column matrix No. 8 Price .25
Three column stereo No. 8 Price 75

Two or Three-Column Newspaper Advertisement



STOP and think! Is there anything you need in your home quite so much as hot water? Morning, noon and night you must have it—a score or more times each day—for shaving, bathing, cleaning, dishwashing, laundering, etc.

A GAS Water Heater
Provides All You Want

No fuss—No waiting—No carrying

Hot water, as much or as little as you need, comes piped right to your faucet when you have a Gas Water Heater in your home. Consider the convenience!

Furthermore the cost is small. A few cents worth of gas heats a tubful.

NOTE!
Put in this space a cut of the particular type of heater you are selling. Water Heater Manufacturers will supply same without charge.

Decide today to use GAS for water heating just as you use it for cooking. Not until then will you know how much comfort Gas Service can really bring you.

TELEPHONE

TERMS
Feature in this space the terms or special offer you wish to make

THE GAS COMPANY
(Insert Company's Address)

Two-column matrix No. 9 Price .25
Two-column stereo No. 9 Price .50

Three-column matrix No. 9 Price .25
Three-column stereo No. 9 Price .50

MANUFACTURERS SECTION

JOHN S. DeHART, Jr., Chairman — F. A. LEMKE, Vice-Chairman

PERCY H. HALL, Secretary

MANAGING COMMITTEE—1922

At Large

BRILL, A. P., Pittsburgh, Pa.
CLOW, K. S., Chicago, Ill.
COLLINS, D. J., Philadelphia, Pa.
CRANE, WM. M., New York, N. Y.
DEHART, JR., JOHN S., Newark, N. J.
DICKEY, C. H., New York, N. Y.
FERRIS, E. J., New York, N. Y.
GREENE, J. J., New York, N. Y.
GRIBBEL, W. GRIFFIN, Philadelphia, Pa.
KNAPP, F. H., Pittsburgh, Pa.
KOPPER, WM. B., Brooklyn, N. Y.
LEMKE, F. A., Kalamazoo, Mich.
McDONALD, DONALD, New York, N. Y.
ROPER, GEORGE D., Rockford, Ill.
SHERWOOD, J. M., New York, N. Y.
STITES, TOWNSEND, Gloucester, N. J.

Affiliated Representatives

GIBSON, W. R., Toronto, Can. (Canadian)
MILLER, THOMAS D., Detroit, Mich. (Illinois)
WESTON, J. A., Lansing, Mich. (Indiana)
ROPER, GEORGE D., Rockford, Ill. (Iowa Dist.)
SCHALL, H. D., Detroit, Mich. (Michigan)
KELSEY, L. D., Brookfield, Mo. (Missouri)
NORTON, ARTHUR E., Boston, Mass. (N. E. Gas Eng.)
LONG, H. J., New Brunswick, N. J. (New Jersey)
EGLESTON, G. P., San Francisco, Calif. (Pacific Coast)
BARTLETT, C. E., Philadelphia, Pa. (Pennsylvania)
SEIDENGLANZ, C. H., Dallas, Tex. (So. Central)
SPARKS, F. F., Chattanooga, Tenn. (Southern)
McCULLOUGH, CHARLES, Milwaukee, Wisc. (Wisconsin)

CHAIRMEN OF SECTION COMMITTEES ORGANIZED TO DATE

Exhibition—JOHN S. DEHART, JR., Newark, N. J.
Nominating—GEORGE D. ROPER, Rockford, Ill.
Division of Accessories Manufacturers—J. M. SHERWOOD, New York, N. Y.
Division of Apparatus and Works Manufacturers—D. J. COLLINS, Philadelphia, Pa.
Division of Gas Range Manufacturers—WM. M. CRANE, New York, N. Y.
Division of Heating Appliance Manufacturers—K. S. CLOW, Chicago, Ill.
Division of Industrial Appliance Manufacturers—WM. B. KOPPER, Brooklyn, N. Y.
Division of Lighting Appliance Manufacturers—TOWNSEND STITES, Gloucester, N. J.
Division of Motor Manufacturers—DONALD McDONALD, New York, N. Y.
Division of Office Labor Saving Devices Manufacturers—E. J. FERRIS, New York, N. Y.
Division of Water Heater Manufacturers—A. P. BRILL, Pittsburgh, Pa.
Division of Supply Manufacturers—J. J. GREENE' New York, N. Y.

The Manufacturer in the Gas Industry

THOMAS D. MILLER, *Before the Annual Meeting of the Illinois Gas Association*

MANY well-founded theories concerning the future interest of the gas appliance manufacturer and his probable relationship to the personnel of the gas industry have, in the main, been tinged with the belief that the industry is too slow-moving to keep pace with the insistent demands under which he moves, and these theories have more or less inferred that as time went on the industry would see less and less of him. Now, either the manufacturer is slowing down, generally speaking, or the industry is picking up, for each successive year's A.G.A. exhibit shows more and more manufacturer companies exhibiting.

There is not much doubt as to where the change of pace has occurred. No one would have ventured the statement in former years that the gas industry would cheerfully support an Association Budget of $100,000. Yet this point has been reached and passed, and, at a time when earnings are still perilously low, the whole thought of the industry is to still further mend its fences even if further expense is involved, rather than to return to the ancient "penny-wise and pound-foolish" mirage of other days.

One of the next steps in this direction will be the elimination of the idea of a fixed return upon a fixed valuation, as governing utility earnings. This idea has taken hold on the popular mind, for the reason that it was easy of comprehension, but it will not stand much further examination. It is too wasteful. It denies the conception of any progress in the development of the art. Why further perfect processes and economies when ALL the profit therefrom is lost to the investor and given to the consumer?

Here is heard the voice of the manufacturers. Those who are competitively engaged in the production of works, machinery and kindred apparatus are directing their efforts along the line of economy in the operation and process of their product; which means that the manufacturer's support in the coming contest of ideas in rate-making is already on tap—in fact it is leaking badly. They cannot sell on the above basis unless the Gas Companies, by sharing with the consumer in the benefits of these economies, have the incentive to profit allowably at the hands of the various state commissions.

There is an increase in comment and experiment on the subject of complete recovery in the use of coal. Gradually there will be more and more exploration into this field, until finally it may come to pass that the utilization of coal by any but a distillation process will be prohibited by law. The one big obstacle to rapid progress in this development is, as previously mentioned, the present-day habit of thinking that a Gas Company or any other utility should never be allowed to profit beyond a fixed percentage of a fixed property value.

The Spirit which drives business and thrives lustily in the market places was a large element of the impetus which the manufacturers contributed to Gas Associations in the past. The actuating thought in the one big Gas Association we have today goes beyond this, and although still but a beginning, has embraced activities that would have been scouted as visionary and dangerous not many years ago.

The manufacturer has not in any sense lost his part in the process, however. The appliance manufacturer is now undergoing something of a metamorphosis and will presently appear as the manufacturer of industrial as well as domestic appliances. Analyze the sendout and see how the gross is divided in these days of gas bake-ovens and other gas-fired furnaces hidden in the bricks and mortar of inconspicuous manufacturing establishments.

The Manufacturers' Section of the A. G. A. owes something of its present-day reputation for success to the Illinois Gas Association. This statement may come as something of a surprise and the story may prove interesting. Some years ago the solidarity of the Section was seriously threatened as a result of the spread of the exhibit idea throughout all state and regional associations. The manufacturers as a group were impressed with the increasing expense of exhibits, while at the same time certain of them were subjected to such pressure by local associations in need of funds for entertainment programs as to make exhibiting absolutely necessary if business relations were to be maintained. The situation had so drifted without particular intent on the part of anyone that it became,

plainly speaking, a hold-up, and it had to be met with tact and clear-headedness on both sides. At this point the Illinois Gas Association, although it had already made plans for an exhibit at its coming meeting, voted to abandon the project upon learning the truth of the situation. This lead was followed by other state associations, and the threat of conflict within the section vanished.

The changes in the structure of the Manufacturers' Section that have been made of late years have been brought about by the demand that all unnecessary correspondence and meetings be eliminated. The various divisions are on the lines of similarity of product and hence community of interest, and the chairmen of these divisions now constitute the advisory committee to the chairman of the section.

Present indications promise in this year's exhibit something different from what we have experienced since the N. C. G. A. Exhibit at Philadelphia in 1913, to which the general public were admitted and to which they came in such swarms as to prevent the Gas Company purchasers from reaching the exhibits.

The Exhibit and meetings of the 1922 Convention of the A. G. A. will probably be located on one of the great pier structures along the Atlantic City Boardwalk. Present arrangements call for the use of the entire pier space, with the Exhibit next to the Boardwalk and the meetings out toward the sea. This will make it possible to throw the exhibit open to the public at certain hours and will compel every member of the association attending the meetings to at least give it a passing examination.

When it is borne in mind that the public at this great national playground is a fairly representative cross-section of the whole country on vacation, looking for new sights and sounds and hungry for excitement, the conclusion is reached that at least from the manufacturers' standpoint the show will be attended with desirable results.

Several large manufacturing companies, some outside of the Gas Industry, have already discovered the fact that the Atlantic City Boardwalk is the place to catch the wary purchaser off guard and have established permanent exhibits there. Reports indicate astonishing returns from these advertising investments.

The industry shows everywhere indisputable signs of awakening from the enforced inactivity of war times and the torpor induced by post-war conditions of labor and material and with the concerted effort that is gradually becoming fact, hope is warranted that it will become popular in other ways than as a target for the shafts of irresponsible local political movements.

IN MEMORIAM

Mr. Wareham Strong Baldwin of the United Gas Improvement Co. died at the Harrisburg Hospital on Sunday morning, February 26, 1922.

Doggone!

Courtesy of the State Gazette, Trenton, N. J.

Distribution Losses[1]

THE object of this article is to point out how there can be no such thing for gas companies the country over as a standard or allowable maximum of distribution losses, or so-called "leakage." Manufactured gas only is here considered.

In the gas industry, the term "leakage" and also the term "unaccounted-for gas" as descriptive of the distribution losses have been generally abandoned as being misleading. A considerable portion of the distribution losses is not leaked gas.

From testimony given in Equity Case No. 136-N in the United States District Court of the District of Kansas, First Division, a ruling was made establishing for well-operated natural gas utilities a leakage of 200 M cu. ft. of gas per mile of 3" main, and in the testimony it was contended that 100 M was the allowable amount for a manufactured gas utility.

A perusal of the reports of some forty well-operated plants in the North, South, East and Mid-Western parts of the United States shows conclusively—

A. That any "standard" of distribution losses for manufactured gas companies is an absurdity, whether expressed in per cent. of sale or in cu. ft. per mile of mains.

B. That distribution losses expressed in per cent. of sales bears no direct relation to the distribution losses per mile of 3" main.

C. That there is a considerable variation from year to year in distribution losses expressed in per cent. of sales.

(1) So many inquiries have been received at Association Headquarters recently as to the amount of unaccounted-for gas per mile of 3 inch main which may be considered good practice that the Managing Committee of the Technical Section has prepared the accompanying statement on "Distribution Losses." The purpose of this article is to indicate why there can be no such thing for gas companies throughout the country as a standard or allowable maximum of distribution losses.

Distribution losses include changes in volume due to temperature differences and all gas for which the gas company receives no revenue. A considerable portion of the distribution losses may be accounted for as follows—

1. Incorrect measurement of gas made at manufacturing station, due to faulty registration of station meters.

The ordinary drum type of wet station meter usually measures the gas correctly. These meters should, however, be tested periodically and regularly.

Other types of station meters, which indicate the volume rather than actually measure it, have in recent years been installed because of their low first cost. As a rule, the accuracy of measurement of these indicating meters cannot be assured except by comparing their registration with that of another meter which is known to be correct.

2. Errors in registration of consumers' meters.

The consumers' gas meter is one of the most accurate instruments in existence by which a manufactured product is retailed to the public, but most of the troubles that do develop with these meters tend to make them run slow. Realizing the importance of having the registration of consumers' meters as accurate as possible, the gas industry and Public Service Commissions have generally adopted the practice of testing all meters at regular intervals. From a study of the results of all meter tests and balancing the fast meters against the slow, an accurate estimate can be made of the amount thus contributed to the distribution losses.

3. Differences in temperature of the gas as measured at the manufacturing stations and at the consumers' meters.

This error can be corrected by the use of suitable correction factors for the temperatures at the station meter and the consumers' meters respectively. This is usually one of the largest items of apparent distribution loss.

4. Errors in the estimate of the volume of unmetered gas used by street lamps.

5. Mechanical defects, causing a small percentage of consumers' meters to cease to record, or in other words, to run 100% slow.

6. Shrinkage due to condensation. In all manufactured-gas distributing systems, there is more or less condensation of water and of hydro-carbon vapors from the gas. The shrinkage thus caused increases apparent distribution losses.

7. Discrepancies due to overlapping of periods of reading consumers' meters at the beginning and ending of the year. It is impossible to read all of the consumers' meters on the same day.

8. Leakage from storage holders and connections.

9. Stolen gas.

10. Gas lost in purging new street mains and services.

11. Gas lost in drilling and tapping street mains for service connections, and for connecting new mains.

12. Gas used in filling new mains and services, or a new holder in case one is built during the year.

13. Miscellaneous loss not detailed.

14. Leakage in mains and services. This will include breaks in mains and services due to unusual strains. These breaks cannot be foreseen nor can they be prevented by any amount of overhauling the main system. All gas thus escaping increases the distribution losses.

The measurement of actual main and service "leakage" as formerly done by isolating certain sections of the distribution system and shutting off all meter cocks, is impracticable and inadvisable because of the inconvenience to consumers, who now use gas so generally throughout the twenty-four hours that continuous gas supply is necessary.

For purposes of comparison, distribution losses are usually expressed in

terms of the mileage of street mains reduced to a 3" basis.[2]

It is impossible to predict with any degree of accuracy what this should be for any particular locality, without first making a careful study of all the sources of loss as previously listed. These factors are incapable of accurate estimate. Moreover, after due allowances have been made, and the calculated "leakage" per mile of 3" main has been determined, it is true that, even with a most thorough overhauling of the mains and services, the underground system cannot be maintained even approximately bottle-tight.

Where this "calculated leakage" seems to be too high, it is generally good practice in closely built-up sections to carefully bar over all street mains and service connections, and repair all leaks so found. This repair work is attended with no little difficulty and expense, owing to proximity of electric, telephone and telegraph conduits, water, sewer, drain pipes and other underground structures, and a determination in any particular case whether this work can be economically justified is a matter of balancing the estimated cost of such work against the estimated probable saving and this cannot be determined empirically by the gas distribution losses per mile of 3" main.

A perusal of the reports for the various utilities makes it obvious that the main and service "leakage" even if accurately obtainable, would be no true indication of the efficiency of a utility. One utility, due to nature of the soil, absence of expensive paving, climatic or local conditions, may be able to maintain underground structures in first-class repair for one quarter of the cost that would be required by another utility operating in a territory where adverse conditions are encountered.

By making certain assumptions, any gas company can estimate how much it will be economical for it to spend in overhauling its underground systems. For example—

ASSUMPTIONS:

Estimated percentage of total distribution losses it is possible to save by systematically overhauling mains and services. (This is merely an estimate)—30%.

Estimated cost of new money needed to finance the overhauling work—7%.

Period of years that new money will be charged off to operating—5 years.

Percent of principal to be charged off each year for 5 years on a 7% basis—17.4.

Actual leakage per mile of 3" main—say 250 M. cu. ft.

Typical holder cost per M cu. ft. (exclusive of distribution, commercial and overhead costs) 60¢

250M x 30% = 75M saving

75M saving at 60¢ per M = $45 saving

Cost of financing 7% plus retirement 17.4% = 24.4%

$45 saving divided by 24.4% x 100% = $184, or amount that it would be economical to spend for overhauling mains and repairing leaks per mile of 3" main.

(2) The 3" main equivalent of any street main system can be obtained as follows:

Size of Main Actual Internal Diameter	Length in Feet	Factor to Reduce to 3" Basis	Equivalent Main of 3" Diameter
2"	3,000	2/3	2,000
3"	6,000	3/3	6,000
4"	8,000	4/3	10,666
10"	4,000	10/3	13,334
			32,000

$\frac{32,000}{5,280}$ equals 6.06 miles of 3" main equivalent.

The cost of thoroughly overhauling a mile of main and services (examining every joint and service) varies from $1,000 to $4,000. Ordinary barring over mains and services and some repairing of leaks can be done for, say $200 or $400 per mile of main, depending on local conditions, such as kind of paving, on the number of leaks found, and on the number of joints it is found necessary to uncover and repair.

Gas companies at the present time exercise very great care in the installation of all new mains and services in the quality of the work done, so as to insure their remaining gas tight through a long life.

Distribution losses in well-operated manufactured gas companies, expressed in per cent of sales, vary from 8% to 15% with an average of, say, 12%. This will vary largely with the amount of gas sold per year per mile of main. Distribution losses per year per mile of 3" main vary between limits of 170 M and 380 M, with an average in the neighborhood of 250 M per year per mile of equivalent 3" main.

In illustration of the explanations made above, the following figures represent the result of a careful and detailed calculation, in a large city, of the factors there entering into the total of distribution losses for a given year.

The figures given are percentages of the total distribution losses which are taken as 100%.

	%
(1) Incorrect measurement of gas made by the station meter	0.00
(2) Incorrect measurement of gas by consumers' meters	8.00
(3) Difference in volume due to temperature of gas as measured	48.50
(4) Incorrect estimate of volume of gas used in public street lamps	3.50
(5) Cease-to-record meters	0.01
(6) Shrinkage due to condensation	0.12
(7) Discrepancy due to overlapping at beginning and end of year	0.70
(8) Leakage from storage holders and connections	0.02
(9) Stolen gas	5.00
(10) Gas lost in purging	0.01
(11) Gas lost in street operations	0.01
(12) Gas used for filling new mains and services	0.01
(13) Miscellaneous	0.03
	65.91
(14) Balance, presumably gas leaked in mains and services	34.09
Total Distribution Losses	100.00

In that particular case, it is seen that about two-thirds of the total distribution losses are accounted for otherwise than by "leakage" in the underground system.

In that city the total distribution losses are about 450,000 cubic feet per mile of 3" main.

The losses due to leakage in the underground system (Item 14) are about 153,000 cubic feet per mile of 3" main, which is a very good result for the conditions in this particular city.

The Seaboard Liquid Process of Gas Purification

*F. W. SPERR, Jr., Chief Chemist, The Koppers Company, Pittsburgh, Pa.

EDITOR'S NOTE: *It has usually been the custom to reprint in the Monthly, papers to which have been awarded the Beal Medal, but due to the completeness with which the Seaboard Liquid Process of Gas Purification was described and the length of the paper together with the appendix (100 pages), only portions of this paper and the appendix, together with a few figures have been selected for publication in the Monthly. The original context was kept as much as possible, but because of the large reduction in the length of the paper, some revisions and rearrangements were necessary.*

THE removal of hydrogen sulphide from gas by a process of liquid treatment, which can be operated in a system of scrubbers, tanks, and pumps, has obvious advantages over ordinary oxide purification and has long been an ideal of the artificial gas industry. For a number of years, The Koppers Company has been conducting an investigation of this subject, and has developed a number of processes, one of which has been in continuous, large-scale operation at the plant of the Seaboard By-Product Coke Company for over a year. Our experience with this process, and the results of an exhaustive experimental investigation, have been so successful, that we believe it capable of largely supplanting ordinary oxide purification, over which it has the advantage of simplicity, elasticity, economy, and reliability.

In the development of this, which we call the Seaboard Process, special acknowledgment for important contributions should be made to Mr. C. J. Ramsburg, Vice-President of The Koppers Company, and to Messrs. D. L. Jacobson, E. H. Bird, R. E. Hall, and M. W. Beebe of the Research Staff of this company. Patents covering the essential features of the process have been granted, while others, dealing with various modifications, are pending.

A résumé of the literature on liquid purification was prepared by Mr. Jacobson as a supplement to the original paper and shows the various developments that have been made in relation to this subject, up to the present time; but owing to the length of this article the résumé is omitted.

Outline of Seaboard Process:

The process is one of utmost simplicity, and an outline of it can be given in very few words. The gas is scrubbed with a solution of sodium carbonate, which absorbs practically all the hydrogen sulphide and the hydrocyanic acid and some carbon diozide. The fouled solution is thoroughly aerated, whereupon the absorbed gases are expelled and the solution regenerated so that it can be used again to scrub the gas. Thus the circulation of the solution is continuous through all stages of the process.

Description of Apparatus:

The apparatus used is shown in dia-

*Chairman, Sub-Committee II of the Purification Committee.

grammatic form in Figure 1. The raw gas, after removal of the tar and ammonia, passes into the scrubber A, which we designate as the absorber. The sodium carbonate solution is pumped from the tank D through the absorber and flows out into the tank C. The fouled solution from tank C is pumped over a second scrubber B—which we call the actifier—into which air is blown by the fan E. The revivified solution runs into the tank D, from which it is continuously pumped back over the absorber. The air and gases of decomposition are either allowed to escape from the top of the actifier through a stack directly into the atmosphere, or may be disposed of in other ways, or by certain modifications of the process it may be possible to recover and utilize the hydrogen sulphide.

It will be seen that the apparatus required consists simply of two scrubbers with pumps and tanks as auxiliary equipment. At our Seaboard plant, we were so fortunate as to have idle benzol scrubbing equipment available, so that after some preliminary experimentation, the process could at once be applied on a large scale at trifling expense. Ordinary benzol scrubbers filled with wooden hurdles were found very satisfactory.

Use of Benzol Plant Equipment:

This at once suggests a very practical answer to the query that was so common at the end of the war: "What shall we do with our benzol plants?" Most of these plants can, with comparatively simple alterations, furnish large additional purifying capacity, which is usually much needed by the gas works with which they are connected.

Use of Tile Packing:

In new installations, however, we find that considerable economy will be gained by the substitution of special tile packing for the wooden hurdles. Very satisfactory packing consists of the so-called spiral ring tile. Such packing has about three times the ratio of surface to volume as that afforded by ordinary wooden hurdles. This ratio has been found very important in determining the size of apparatus required to handle a given amount of gas, and the use of packing with a large ratio of surface to volume makes it possible to use smaller absorbers and actifiers.

Simplified Design for Smaller Plants:

In the design of new plants where the total gas is not over 8,000,000 cu. ft. per day, construction and operating costs are reduced by combining absorber, acti-

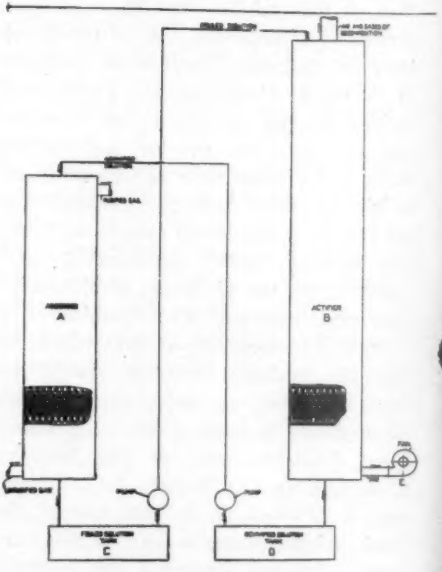


Fig. 1

fier and stack in one tower, as shown in Figure 2.* The sump may be provided in the foundation for the tower. This single compact unit requires a minimum amount of labor and supervision, there being only one pump and one fan, and can be taken care of by the men operating nearby machinery in part of their regular time. No extra labor, therefore, has to be employed for the liquid purification plant.

Advantages of Liquid and Dry Purification in Combination:

Before proceeding with further consideration of the process, it should be stated that most of our work, so far, has been done on the combination of the Seaboard process with ordinary oxide purification, in which the bulk of the hydrogen sulphide is taken out by the former, while the remainder is removed by means of oxide. The primary reason for this is that the Seaboard plant already had a large installation of oxide purifiers, and the immediate problem has been to make the most economical use of existing equipment, rather than to put this out of commission and replace it entirely with different apparatus.

The removal of 85 to 95% of the hydrogen sulphide from the gas is readily effected by the Seaboard process, and it has been experimentally demonstrated that the process can be operated in such a way as to remove the last traces. There are, however, certain special advantages in the combination of liquid purification with oxide which will be described here.

In ordinary oxide purification, the admission of air to the gas entering the purifiers, in sufficient quantities to effect continuous revivification, is highly desirable,

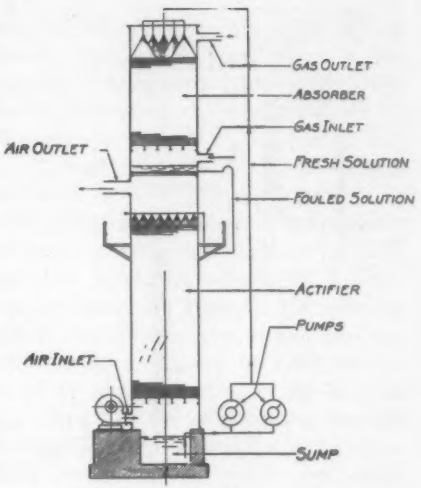


Fig. 2

as prolonging the life of the oxide in situ and reducing the labor of emptying and refilling the boxes and turning over the oxide on the ground. Ordinarily, however, especially in the case of coal gas carrying several hundred grains of hydrogen sulphide, continuous revivification may be practiced only to a limited extent. If air carrying the theoretical percentage of oxygen is used, excessive heating is likely to result. Even when the addition of air is limited so as to accomplish only partial revivification, trouble with caking of the oxide and with increase of back pressure is usually encountered. Sometimes, an additional objection is found in the reduction of heating value due to the nitrogen from the air used.

The case is quite different when oxide is used to complete the purification of the gas from the liquid process. Such gas may contain, say, 20 to 40 grains H_2S per 100 cu. ft. A slight excess of air can readily be added to maintain continuous revivification, and the accompanying ni-

*In this diagram the stack has been omitted.

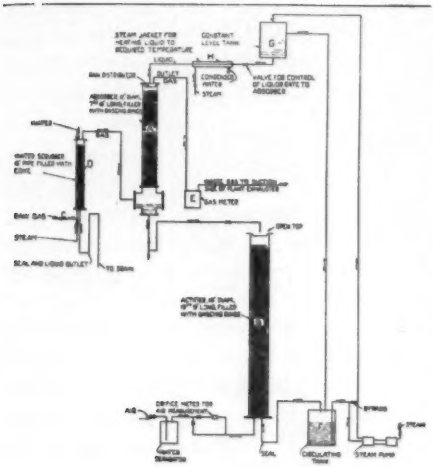


Fig. 3

trogen will have practically no effect on the heating value of the gas.

Experimental Work:

Many of our investigations have been made with an experimental purification apparatus, located in the by-product building of the Seaboard By-Product Coke Company, and this work has afforded much valuable information. The apparatus used is shown in diagrammatic form in Figure 3 and has capacity for handling large volumes of gas and solution, so that the results obtained with it are of practical character and do not represent mere laboratory experiments.

Practically all the data necessary in the design of the larger plant were worked out with this apparatus. Also a comparative study was made of all conditions affecting the process, such as temperature, H_2S content of gas, strength of solution, rate of flow of gas, air and solution. This apparatus was well suited for this work and we later found that the experimental results were representative of plant operation.

Chemical Reactions:

In dealing with the theoretical aspects of the Seaboard process, a most interesting field of research has been developed. The scope of this paper does not permit any attempt at a complete discussion from this standpoint; but a brief outline of the chemical reactions involved may contribute to a better understanding of the process.

The absorption stage of the process is characterized by three reactions between the acidic constituents of the gas and the sodium carbonate in solution.

(1) $H_2S+Na_2CO_3=NaHS+NaHCO_3$
(2) $CO_2+H_2O+Na_2Co_3=2NaHCO_3$
(3) $HCN+Na_2CO_3=NaCN+NaHCO_3$

These are reversible reactions, governed by the law of chemical mass action and under proper conditions may be caused to proceed from left to right. Such conditions produce the actification stage of the process as follows:

(4) $NaHCO_3+NaHS=Na_2CO_3+H_2S$
(5) $2NaHCO_3=Na_2CO_3+H_2O+CO_2$
(6) $NaHCO_3+NaCN=Na_2CO_3+HCN$

Consideration of the foregoing equations will show that the essential requirements of actification is the decomposition of the sodium hydrosulphide (NaHS) and the sodium cyanide (NaCN) formed in the absorption stage. The sodium bicarbonate ($NaHCO_3$) also undergoes direct decomposition; but since we are not especially concerned with the removal of carbon dioxide from the gas, the bicarbonate is of principal importance in its reactions with the sodium hydrosulphide and cyanide, and its complete decomposition in the actifica-

tion stage is neither necessary nor desirable. The decomposition of the sodium hydrosulphide and cyanide, according to reactions (4) to (6) inclusive, is favored by the following conditions:

1. Presence of an excess of sodium bicarbonate.

2. Rapid dilution or rapid removal of the gaseous products of reaction, H_2S and HCN.

3. Presence of an excess of CO_2 in contact with the solution in the actifier.

In addition to the primary reactions, minor secondary reactions occur, namely, the formation of sodium thiosulphate and sodium thiocyanate. These are inactive salts and are very soluble in water. The decrease in strength of solution due to the formation of these salts is made up by periodical additions of soda ash. We feel fully justified in allowing these inactive substances to accumulate until their rate of formation is balanced by the mechanical losses of solution. One pound of soda ash, costing less than 2 cents, is sufficient to purify 20,000 cu. ft. of coal gas, making up for the formation of inactive salts and unavoidable mechanical losses. As water gas contains practically no hydrocyanic acid, the soda consumption is much less than with coal gas.

Permanent Plant for Liquid Purification:

The temporary Liquid Purification Plant of the Seaboard By-Product Coke Company, together with the oxide purifiers, had proven ample to handle 15 to 16 million cubic feet of gas per 24 hours. This system, however, had not been long in operation before it was decided to increase the output of surplus gas to 25 million cubic feet per day. Work was then begun on the enlargement of the Liquid Purification Plant to meet this requirement. Two 86-ft. benzol scrubbers were used as absorbers and two actifier towers, each 20 ft. in diameter and 45 ft. high, were built. These actifier towers were filled to a height of 30 ft. with spiral ring packing, which enabled us to use a much more compact apparatus than would be possible if hurdles were employed. The air for actification is furnished by one of two blowers, each having a capacity of 2,500,000 cu. ft. of air per hour. One of the blowers is a spare. The air, after passing through the actifiers, is conducted into a 200 ft. brick stack. At this height, the hydrogen sulphide is so diluted and so rapidly diffused with the atmosphere, that no appreciable odor is detected outside of the plant.

The blower building also contains the pumps, circulating tanks and storage space for soda ash. There are two sets

Fig. 4

of pumps—one of each set being a spare. The pumps are of centrifugal type, each having a capacity of 60,000 gal. per hour. The circulating tanks are built of reinforced concrete, forming part of the basement structure. Each tank has a capacity of 8,500 gallons. Other storage capacity, making a total of 35,000 gal. for the solution, is provided in bases of actifier foundations.

A view of the permanent liquid purification plant, now in operation at the plant of the Seaboard By-Product Coke Co., is shown in Figure 4.

Four pair of oxide boxes which were in operation before the introduction of wet purification are operated in combination with the liquid purification apparatus to remove the rest of the hydrogen sulphide from the gas. With the arrangement of the oxide boxes in pairs, a noteworthy reduction of back pressure is effected. The pressure drop through the combined liquid and oxide purification system is about 15 inches (water) less than if dry purification alone were employed.

In designing this plant, the existing facilities have been utilized so as to make the construction as economical as possible. The benzol scrubbers used as absorbers are unnecessarily tall, and the apparatus is not so compactly arranged as would be possible in an entirely new plant.

The Seaboard Liquid Purification

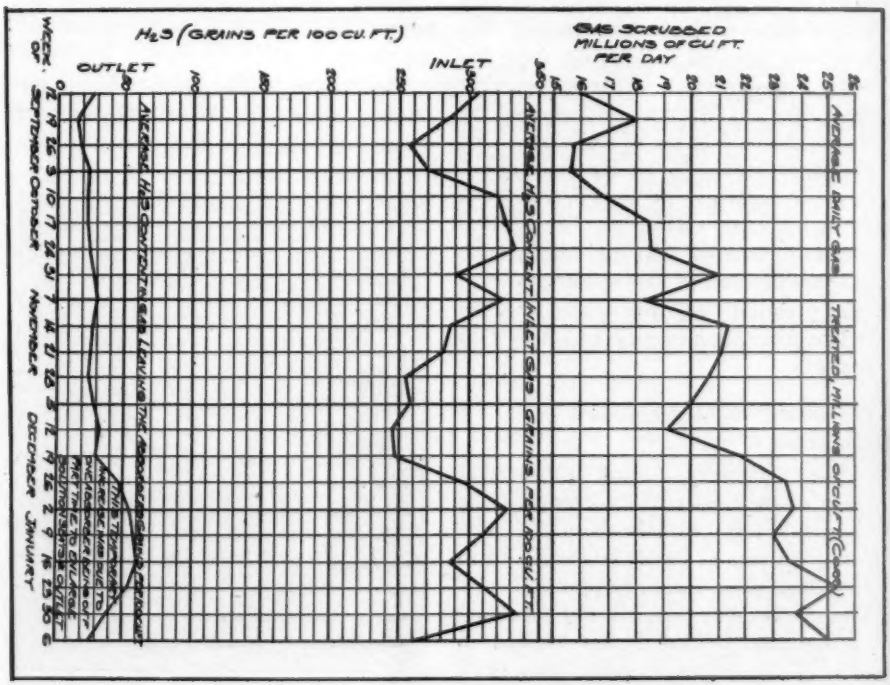


Fig. 5

Plant was expected to treat 25,000,000 cubic feet of gas per 24 hours, removing at least 80% of the hydrogen sulphide. The plant, however, has far exceeded expectations and has been treating 25,000,000 cu. ft. of gas every 24 hours, reducing the hydrogen sulphide to less than 30 grains per 100 cu. ft. The capacity of the plant as a whole has been shown by tests to be 30,000,000 cu. ft. per day.

The most recent cost figures for liquid purification of gas are given in the accompanying tabulation. Operating data showing gas scrubbed and H_2S in inlet and outlet gas are shown in graphical form in Figure 5.

Application to Water Gas:

The application of the Seaboard Liquid Purification Process to carburetted water gas is of special interest. Practical tests were made under operating conditions and the results show a high purification efficiency. The hydrogen sulphide content of the gas was reduced from an inlet of 130 to 150 grains per 100 cu. ft. before the absorber to 20 grains after the absorber. A thorough series of determinations on the heating value of the gas before and after the absorber demonstrated conclusively that there is no loss of heating value of the gas in the liquid process. The Seaboard process is, therefore, considered excellently adapted to the purification of water gas.

Advantages of the Seaboard Process:

The operating costs have been reduced about 50% at the Seaboard plant. The costs of installation are also much lower.

The ground space required for the liquid purification plant is about one-third of that required for oxide boxes, oxide storage, and revivification. This is of special importance to plants where it is desired to increase present purification capacity and in many cases the saving in land is of great value. In some cases, it enables a large increase in purification capacity where there is absolutely no room for additional boxes.

One of the most notable features of the liquid purification process is its flexibility. Under ordinary operating conditions with oxide purification, sudden increases in the sulphur content of the gas, due for example to a higher sulphur content of the coal, cause serious disturbance to plant operations. Boxes have to be changed immediately and a great deal of labor is needed. With the liquid purification process, however, sudden increases in the H_2S content have very little effect on the H_2S content of the outlet gas, there is no interruption to the regular operation, and no H_2S gets by the purification plant. This is especially important where high sulphur coals are used. There is no doubt that each year more and more of high sulphur coals will come into use, as the supply of low sulphur coal is exhausted. In many cases also, the high sulphur coal is much cheaper. Where high sulphur coal is used, the liquid purification process is the logical one to install.

The removal of practically all the hydrocyanic acid and part of the CO_2 in the liquid purification process is of vital interest to the gas manufacturer. The report of the Committee on Deposits in Pipes and Meters of the American Gas Association for 1921 lays special emphasis on the corrosive action of hydrocyanic

acid and gives it first place among the causes for corrosion in iron pipes. The napthalene content of the gas is also reduced considerably by the liquid process, and at Seaboard less than 5 grains per 100 cu. ft. are present in the gas leaving the absorber, which is considerably better than before the introduction of wet purification. The liquid process, therefore, improves the quality of the gas for distribution markedly.

The catch boxes with iron oxide are improved in operation by having the liquid process installed to precede them, because of the removal of practically all the hydrocyanic acid which ordinarily lessens the efficiency of oxide purification, and because a fine spray of soda is carried forward with the gas keeping the oxide alkaline and thereby increasing its activity. The back pressure has been reduced about 15 inches lower than if dry purification exclusively were used.

Summing up, the liquid purification process is more economical, as to operating and installation costs, and the ground space required is minimized. The quality of the gas is greatly improved for distribution by removal of hydrocyanic acid, naphthalene, etc. The process is exceedingly flexible in operation and especially adapted to meet the needs of plants where variations in the sulphur content of the gas are encountered or where high sulphur coals are used.

COST OF LIQUID PURIFICATION BY THE SEABOARD PROCESS

Estimate Based on Actual Operation February 6 to 20, 1922.

Average total gas treated per day	24,970,000 cu. ft.
Rate of soda solution circulation per hour	60,000 gal.
Air rate in actifier per hour	2,500,000 cu. ft.
Average H_2S in inlet gas (grains per 100 cu. ft.)	281
Average H_2S in outlet gas (grains per 100 cu. ft.)	31
Strength of soda solution	3% as Na_2CO_3
Soda ash used per M cu. ft.	0.057 lb.
Soda ash consumption (average per day)	1,425 lb.

Cost per 24 Hours	
Soda Ash—1425 lb. at 2¢	$28.50
Power:	
Pumps—1680 kw-hr. at 1.6¢	26.88
Fan—1160 kw-hr. at 1.6¢	18.56
Labor—One man per shift at $4.00 (3 shifts)	12.00
Supervision and testing	3.00
Repairs and maintenance	10.00
Total	$98.94
Credit power saved by reduction of 15 inches pressure for 24,970,000 cu. ft. gas per 24 hours—850 kw-hr. at 1.6¢	13.60
Net cost of liquid purification per day	$85.34
Cost of liquid purification per M cu. ft. of gas	0.342¢
Estimated cost of catch box operation for removal of remaining 30 grains of H_2S per 100 cu. ft. of gas	0.13 ¢
Total cost of complete purification including liquid process and catch box operation per M cu. ft. of gas	0.472¢

(Continued from page 222)

dent in the unsold market and cash in on the business that is waiting for us if we will only go after it in the right way.

We will never attain our real sales momentum until companies make a regular and definite appropriation for advertising. One per cent of the total gross sales of gas, is entirely reasonable. It may be figured out in other ways—the new business department may take care of the appropriation—but no matter how it is arrived at, it should at least measure up to one per cent of the sales of gas—the ultimate commodity that is merchandised.

We speak of a sales policy. There can be no sales policy in a company that fails to make an annual appropriation for advertising and new business development. Such a company is without a policy. It is simply getting along—that's all.

Portable Demonstrating Water Gas Set

EDWARD H. BAUER, Providence Gas Co., Providence, R. I.

SEVERAL months ago there appeared in the A.G.A. Monthly an article by George Barrows of the Grinnell Co., Providence, which mentioned a small water gas machine used to demonstrate the method of making water gas. This machine, while very crude, actually made water gas from charcoal. Knowing that a demonstration machine would be a valuable asset in lectures given to students or community clubs, etc., it was decided to build a machine that would be more like an actual set, such as furnishes gas to hundreds of cities, but on such a small scale that it could be easily transported from place to place.

The photograph shows the results of our efforts: a complete carburetted water gas set from blower to cooled gas, including a steam boiler which furnishes steam to the generator and oil pump and reservoir from which oil is pumped into the "combined" carburetor and superheater.

Figure 2 shows a diagrammatic drawing of the outfit. At the left is an electric driven blower, such as used for air blast on small industrial gas furnaces. This blower not only furnishes air for the generator through the blast valve "A" but furnishes secondary air through valve "B" and pipe "Q" for burning the producer gas in the top of the carburetor and air for the gas cooler "J" through the valve "C" and piping "R" and "T".

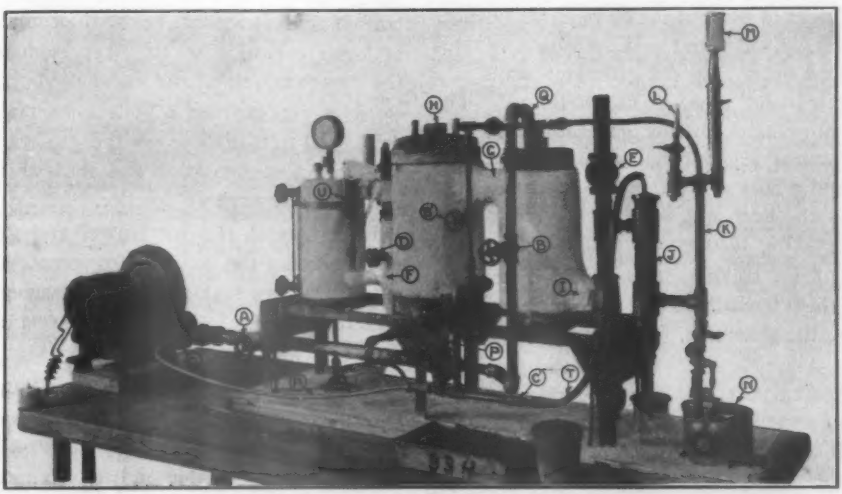


Fig. I

The steam boiler was made of 5″ pipe with tube sheets and tubes added into place. The chamber above the boiler acts as a superheater and insures a dry steam to the generator.

Steam is admitted to the generator through the control valve "D" and spray pipe "F" under the grate. "U" is an old bellows from a recording pressure gauge and is used to indicate the steam flow into the generator. This tells the operator about how much steam to use, so as not to kill his fire.

The gas generator is made of a 6″ pipe nipple with caps on each end. The bottom is made up light but the top is made tight by the use of a bar and the two lugs shown on top. This top is removed when the machine is "clinkered." "P" is where blast enters below the grate. The grate is made of a piece of heavy iron wire screen with about ⅜″ openings and rests upon the steam spray pipe. The generator is lined with ¾″ firebricks to prevent the lining from burning out. (Our first trial machine of this type burned up the generator walls in a few hours' time. It had no lining.) The entire sides of the generator and carburetor are covered with pipe covering and a coat of Hytempite cement to keep in the heat and keep the covering from breaking through handling.

"H" is the charging hole, through which buckwheat size coke is charged into the generator.

A nipple "G" connects the generator and carburetor. The carburetor is made of a 4″ nipple capped top and bottom. It is filled with broken firebrick to act as checkers. Oil is sprayed into the carburetor through the small spray "O".

For an oil pump and tank, we used a Rochester lubricator "N" to force the oil through the copper oil pipe and into the carburetor through "O".

Pipe connection "I" leads the stack gasses to a riser pipe, which has on it the stack valve "E", and when "E" is closed the water gas passes into a cooler "J", which is a piece of 1½″ pipe, in which is inserted a copper coil, through which cold air passes and around which passes the gas to be cooled.

The gas outlet from the carburetor plugged up often and is now made with a dustcatcher at the lower end of the riser pipe.

From the lower end of the cooler, the finished gas passes up through the pipe "K", and on the branches from the tee at the top are placed one open burner "L" and one Junior Welsbach burner "M".

Drips for condensation are placed under the steam line to the generator; at bottom of dustcatcher; below the cooler; at lower end of pike "K", representing the street main drip; and under the burner pipes, representing a house or service drip. All of the drips on the gas train will collect condensation and show their use in actual work or practice.

Electricity to run the blower and gas to burn under the boiler to furnish steam are all that are required to be furnished, and the set can be placed in operation in a few minutes.

Attention is called to valve A′, B′ and C′, which are on a pipe leading to the steam spray. These are used when compressed air is available and no electrical power can be had.

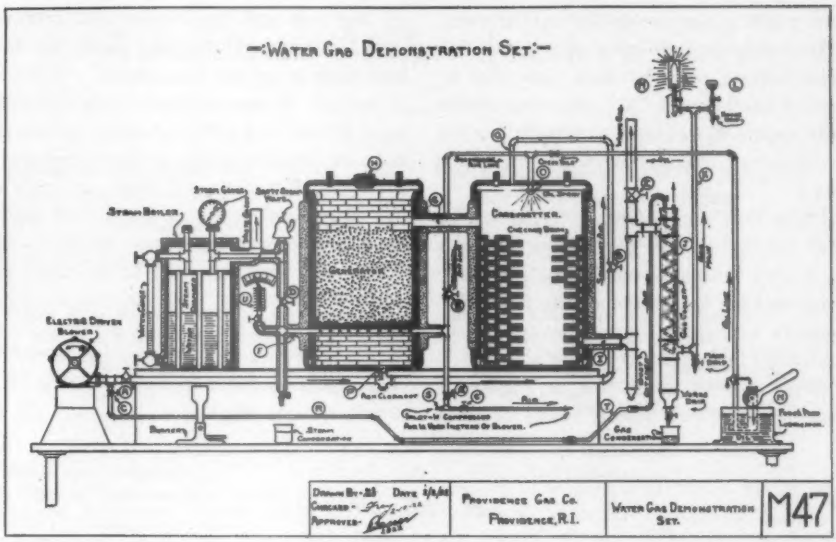


Fig. II

Using compressed air, a hose line is attached to pipe at "S"; "A" becomes the blast valve, "B"' the secondary air valve (a check valve in oil line prevents air backing into oil line) and the valve "C"' controls air to the cooler through hose connection "T" after it is removed from pipe "R".

The apparatus is about 5 ft. long over all. The boiler, generator and carburetor are set up on an angle iron frame, which frame is secured to a board base. The oil pump is also fastened to this base. The blower is connected to the blast main by flexible rubber connections, for not all halls and classrooms have the same current characteristics and the motors have to be changed to suit conditions.

To start the set operating, first start blower and open "C". Some charcoal is ignited and placed on the grate of the generator and the blast valve "A" cracked open to furnish air for combustion of charcoal. Coke, about the size of buckwheat coal, is now charged through "H" at intervals until the fire is well under way; then the blast valve is opened more and the fire brought up to a "healthy" condition. Meanwhile, some producer gas will be made, which can be seen when "H" is lifted slightly while blast is on. Valve B is now opened and the producer gas is burned in the carburetor. Valve "E" necessarily is open during this period. Steam has been generated in the boiler during the heating up process.

As soon as fire is up to temperature, valves "A", "B" and "E" are closed and the cocks under the burners "L" and "M" are opened. Steam is then admitted to the generator through "D". The gas generated will cause the indicator on "U" to move, and this is a guide as to

how much steam to use during the run.

In a few seconds after the steam has been turned on, the blue gas can be lighted at "L" and "M", showing clearly how much more light a mantle burner gives when compared with the open flame.

Oil is now pumped into the carburetor and very soon the blue flame changes to a very luminous one. The oil pump stops and the luminosity of the flame disappears and once more blue gas burns with very little light, if any at all, at "L".

With the set as shown in Figures 1 and 2, we use two-minute blows to bring up the heat and then make four-minute runs, and enough gas is made to use both burners at the same time.

Several demonstrations have already been given with this set along with gas talks or lectures given by our Engineer, Mr. F. C. Freeman, and from all reports the set gave a very clear idea to the audience as to how water gas is made.

The set was designed to be used in educational work. The Providence Gas Co. is carrying on at the present time extensive educational work, and articles will appear in the near future giving full details of this work.

(Continued from page 218)

from a gas main to the street line should be furnished by the company, notwithstanding that the fee of the street has not been conveyed to the city, nor the street formally accepted by it.[47]

The Indiana Commission has declared that it is reasonable for a gas company to bear the expense of installing services to the consumer's property line only.[48] And in Illinois a rule of a gas company providing that the service pipe from its main to the consumer's property should be installed by the company, at its expense, and from the property line to the meter at the consumer's expense, and requiring the consumer to pay for the removing and replacing of pavement and street car tracks where either is removed in the installation, and an extra charge per lineal foot from main to meter when the ground is frozen at the time thereof, has been declared to be just and reasonable.[49]

The rule that a public utility should construct, at its own cost, the laterals or service pipes from the mains to the curb line has always been followed by the Wisconsin Commission excepting in cases of publicly owned utilities, where, on account of past practices of the utility in charging for services, a change in practice would work inequity to existing consumers.[50] A city on paving streets can, under subs. 3 of sec. 925-223 of the Wisconsin Statutes, require a privately owned gas utility to lay laterals from its mains to the curbs at its own expense.[51] And in New York, it has been held that ordinances designed to eliminate the unnecessary opening of pavements by requiring gas service connections not at present needed but likely to be necessary in the future, to be made in advance at the consumer's expense, do not authorize a utility to compel consumers to bear the entire expense of a new installation on streets already paved or on unpaved streets whose pavement is not in immediate contemplation.[52]

[47]First Mortgage & Real Estate Co. v. Westchester Lighting Co. (N. Y.) P. U. R. 1921 B, 178.

[48]Commercial Club v. Citizens' Gas & Fuel Co. (Ind.) P. U. R. 1916 E, 1.

[49]Re Public Service Co. (Ill.) P. U. R. 1918 A. 823.

[50]West Allis v. West Allis Gas Co. (Wis.) P. U. R. 1919 F, 370.

[51]Ibid.

[52]Curtis v. Elmira Water, Light & R. Co. (N. Y.) P. U. R. 1918 D, 41.

Associations Affiliated with A. G. A.

Canadian Gas Association

Date of Affiliation—Mar. 25, 1919
Pres.—C. S. Bagg, Montreal Light, Heat & Power Co., Montreal, Que.
Sec.-Tr.—G. W. Allen, Consumers' Gas Co., Toronto
Conv., Hamilton, Ontario, Aug. 24-25, 1922.

Empire State Gas and Electric Association

Date of Affiliation—Nov. 21, 1919
Pres.—E. H. Rosenquest, Bronx Gas & Electric Co., Bronx, N. Y
Sec.—C. H. B. Chapin, Grand Central Terminal, New York. N Y.
Conv., Lake Placid, N. Y., Oct. 1922.

Illinois Gas Association

Date of Affiliation—Mar. 19, 1919
Pres.—R. S. Wallace, Central Illinois Light Co., Peoria, Ill.
Sec.-Tr.—R. V. Prather, 305 Illinois Mine Workers Bldg., Springfield, Ill.
Conv., 1923.

Indiana Gas Association

Date of Affiliation—April 24, 1919
Pres.—Morse Dell Plain, No. Indiana Gas & Elec. Co., Hammond, Ind.
Sec.-Tr.—E. J. Burke, Citizens Gas Co., Indianapolis, Ind.
Conv., 1922

Iowa District Gas Association

Date of Affiliation—May 21, 1919
Pres.—C. N. Chubb, United Light & Rwys. Co., Davenport, Ia.
Sec.-Tr.—H. R. Sterrett, Des Moines Gas Co., Des Moines, Ia.
Conv., 1922

Michigan Gas Association

Date of Affiliation—Sept. 18, 1919
Pres.—J. A. Brown, Hodenpyl, Hardy & Co., Jackson, Mich.
Sec.-Tr.—A. G. Schroeder, Grand Rapids Gas Light Co., Grand Rapids, Mich.
Conv., 1922

Missouri Association of Public Utilities

Date of Affiliation—June 18, 1920
Pres.—H. Spoehrer, Union Elec. Lt. & Pr. Co., St. Louis, Mo.
Sec.-Tr.—F. D. Beardslee, 315 N. 12th St., St. Louis, Mo.
Wiley F. Corl, Chmn. Affiliation Com., Missouri Utilities Co., Mexico, Mo.
Conv., Daniel Boone Tavern, Columbia, Mo., May 4-5-6, 1922.

New England Association of Gas Engineers

Date of Affiliation—Feb. 19, 1919
Pres.—V. E. Bird, Connecticut Power Co., New London, Conn.
Sec.-Tr.—J. L. Tudbury, Salem Gas Light Co., Salem, Mass.
Conv., 1923

Gas Sales Association of New England

Date of Affiliation—Oct. 1, 1919
Gov.—H. J. Pettengill, Jr., Blackstone Valley Gas & Electric Co., Pawtucket, R. I.
Sec.—M. Bernard Webber, 150 Congress St., Boston, Mass.
Annual Meeting, Boston, Mass., May 12, 1922.

New Jersey Gas Association

Date of Affiliation—April 25, 1919
Pres.—H. H. Newman, Public Service Gas Co., Trenton, N. J.
Sec.-Tr.—H. E. Mason, Consolidated Gas Co. of N. J., Long Branch, N. J.
Conv., Philadelphia, Pa., Apr. 26-27-28, 1922.

Pacific Coast Gas Association

Date of Affiliation—Sept. 18, 1919
Pres.—Henry Bostwick, Pacific Gas & Electric Co., San Francisco, Cal.
Sec.-Tr.—W. M. Henderson, 812 Howard St., San Francisco, Cal.
Conv.—Santa Barbara, Cal., September, 1922.

Pennsylvania Gas Association

Date of Affiliation—April 10, 1919
Pres.—E. L. Smith, Towanda Gas Co., Towanda, Pa.
Sec.-Tr.—Geo. L. Cullen, Harrisburg Gas Co., Harrisburg, Pa.
Conv., Philadelphia, Pa., Apr. 26-27-28, 1922.

South Central Gas Association

Date of Affiliation—Oct. 15, 1919
Pres.—Frank L. Weisser, San Antonio Public Service Co., San Antonio, Texas.
Sec.-Tr.—S. J. Ballinger, San Antonio Public Service Co., San Antonio, Tex
Conv., Hot Springs, Ark., Oct. 10-11-12, 1922.

Southern Gas Association

Date of Affiliation—May 20, 1919
Pres.—L. I. Pollitt, Southern Gas & Electric Corpn., Lexington Bldg., Baltimore, Md.
Sec.-Tr.—G. H. Smith, City Gas Co., Norfolk, Va.
Conv., Greensboro, N. C., May 16-17-18, 1922.

Wisconsin Gas Association

Date of Affiliation—Mar. 25, 1919
Pres.—J. P. Pulliam, Wisconsin Public Service Co., Milwaukee, Wis.
Sec.-Tr.—Henry Harman, 182 Wisconsin St., Milwaukee, Wis.
Conv., 1923.

Employment Bureau

Today there is a pronounced and growing demand for high grade sales executives who can not only profitably merchandise the gas company's product, but who are also capable of handling the public relations of the company.

With the increasing tendency to actively push the merchandising of gas appliances so evident throughout the industry, there is springing up a greater demand for broad gauged and experienced men to fill important positions in gas companies.

The Association will act as a clearing house, and, without charge to its members, assist companies in getting in touch with individuals who are seeking new connections.

All inquiries from companies or applications from individuals should be directed to Association headquarters and will be treated as strictly confidential.

SERVICES REQUIRED

WANTED—Fitter who can do good work on installation of water heaters, ranges and who thoroughly understands Gas Company appliance work. Address A. G. A.
Key No. 01.

HIGH GRADE Industrial Sales Engineer wanted. Must be man having had factory experience and knowledge of house heating. Gas company in middle west has need of such a man and requests applicants to give full particulars of experience. Appointment for interview will be arranged. Address American Gas Association.
Key No. 0-3.

SERVICES OFFERED

WANTED—Position as executive in a local office of a gas or a combination gas and electric company. Have had a practical experience in all branches of commercial utility work. Have been successful in dealing with the public and promoting good will of utility companies. Educated in commercial and accounting methods as compiled by N. C. G. A. and N. E. L. A. Well acquainted in office routine and very exact on details and execution of same. Address A. G. A.
Key No. 114.

GAS APPLIANCE SALESMAN—Especially trained in water and house heating; 15 years' experience; desires selling position, either road or local, with aggressive appliance manufacturer or gas company. Will furnish best selling reference. Drawing account against commission. Address A. G. A.
Key No. 125.

WANTED—Position as Industrial Fuel Engineer or manufacturer's representative of Domestic or Industrial appliances seeks employment. Prefers Eastern territory but will consider other location. Moderate salary and commission or straight salary. 34 years of age. Married. Reliable references. Address A. G. A.
Key No. 137.

WANTED—Position by a man of large general experience in gas business who has made a special study of sales promotion problems, and who would prove valuable as an assistant to a busy executive in any department. Address A. G. A.
Key No. 134.

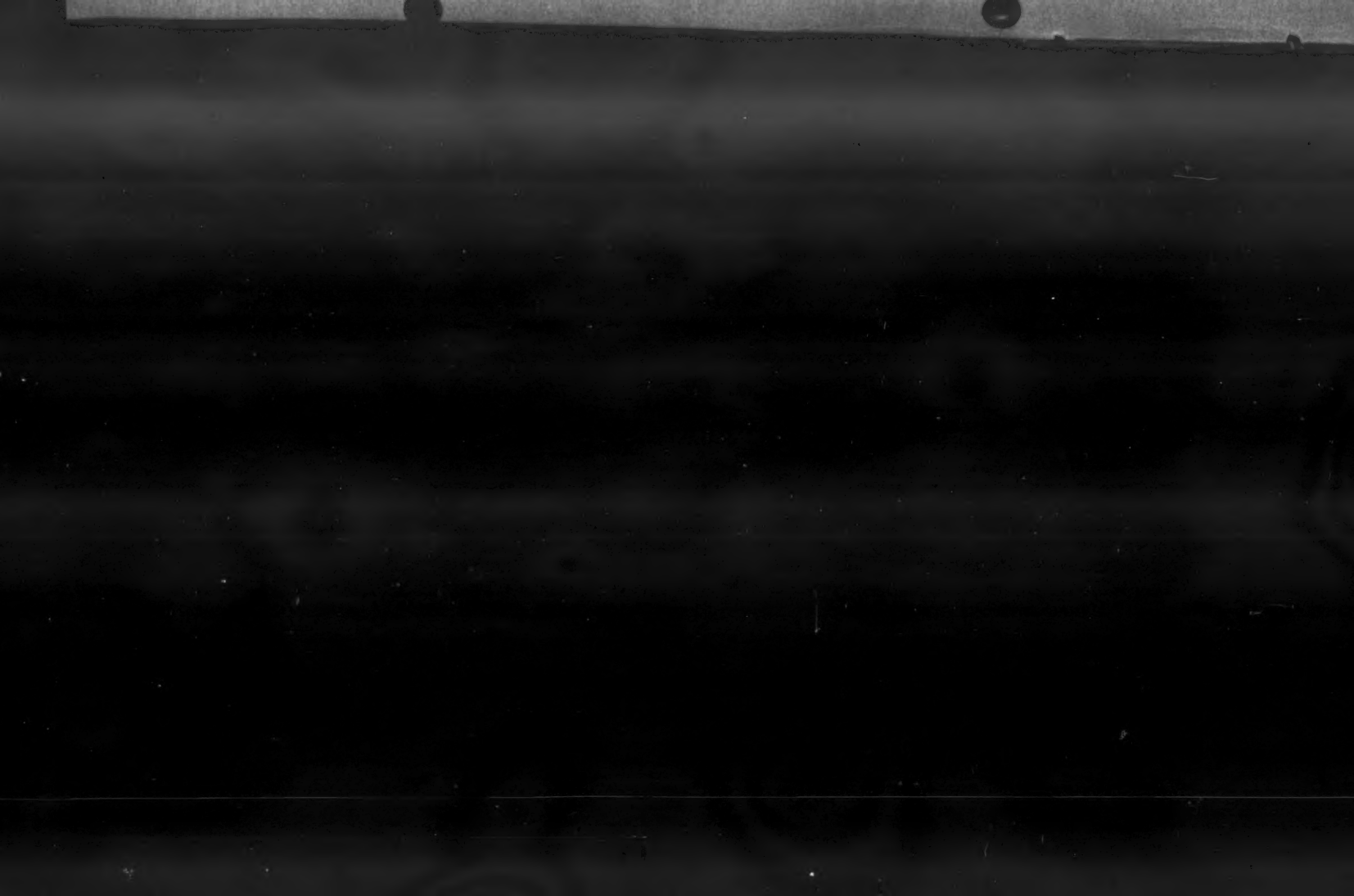
ENGINEER—Producing results in operating desires to make change, either as Engineer or Assistant Engineer of Works with output over 20,000,000 daily output. Or in Managing capacity. Address A. G. A.
Key No. 135.

AS MANAGER OR SUPERINTENDENT—39 years old, 15 years experience as Superintendent, 2 years in By-Product Coke Plants. Familiar with Commercial and Accounting work. Present Supervising several small plants. References.
Address Key No. 136.

GAS PLANT PROPRIETORS—Is your gas plant run down? Is it paying dividends? Let me reorganize it and put it on a paying basis for you. To take personal charge. Address A. G. A.
Key No. 138.

INDUSTRIAL FUEL ENGINEER—Knowing heat treatment as applied to general industrial problems, house heating, hot water storage, and who knows the construction, operation and proper installation of every appliance he handles. Who has sold himself "Gas" as The heat treating medium, who has excellent "business getting" and executive abilities, would like to change to corporation where his abilities can be better utilized. Address A. G. A.
Key No. 139.

POSITION WANTED—Technical graduate with some experience in all branches of combination, manufactured, and natural gas companies, but particularly as head of industrial and new business departments, desires responsible position with a future. Address A. G. A.
Key No. 140.



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It is quite important that this file of our magazine be complete.

AMERICAN GAS ASSOCIATION, INC.

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